

Process for Safety Performance Monitoring

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This report provides an analysis of a process for safety performance monitoring and measurement at the individual product or service provider level as well as at the State level.

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Acronyms

Acronym	Definition
ACAS	Airborne Collision Avoidance Systems
AIDS	Accident/Incident Data System
AIS	Aeronautical Information Services
ANS	Air Navigation Service
ASCOS	Aviation Safety and Certification of new Operations and Systems
ASRS	Aviation Safety Reporting System
ATM	Air Traffic Management
ATS	Air Traffic Service
BTS	Bureau of Transportation Statistics
CAA	Civil Aviation Authority
САР	Corrective Action Plan
CATS	Causal Model for Air Transport Safety
сс	Compliance Checklist
СМА	Continuous Monitoring Approach
смо	(ICAO) Monitoring and Oversight Section
CNS	Communication, Navigation, and Surveillance
EASA	European Aviation Safety Agency
EASp	European Aviation Safety plan
EC	European Commission
ECAST	European Commercial Aviation Safety Team
ECCAIRS	European Coordination Centre for Accident and Incident Reporting Systems
EGAST	European General Aviation Safety Team
EHEST	European Helicopter Safety Team
ESD	Event Sequence Diagram
EU	European Union
EUROCAE	European Organisation for Civil Aviation Equipment
EUROCONTROL	European Organisation for the Safety of Air Navigation
FAA	Federal Aviation Administration
FCL	Flight Crew Licencing



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	FILLID CAR ST. C
FDM	Flight Data Monitoring
FOQA	Flight Operations Quality Assurance
FP7	7 th Framework Programme
GASP	Global Aviation Safety Plan
ICAO	International Civil Aviation Organisation
ICVM	ICAO Coordinated Validation Mission
IEC	International Electro technical Commission
ISO	International Organisation for Standardisation
IRP	Integrated Risks Picture
ISTARS	Integrated Safety Trend Analysis and Reporting System
LEI	Lack of Effective Implementation
MIR	Mandatory Information Request
мои	Memorandum of Understanding
MRO	Maintenance, Repiar and Operations
MS	Management System
NAA	National Aviation Authority
NCMC	National Continuous Monitoring Coordinator
NTSB	National Transport Safety Board
OLAP	On-Line Analytical Processing
OLTP	On-Line Transaction Processing
OPS	Operation of Aircraft
PQ	Protocol Question
RWS	Runway Safety Office, Runway Incrusions
RCCA	Root Cause Corrective Action
SAAQ	State Aviation Activity Questionnaire
SARPs	Standards and Recommended Practices
SDCPS	Safety Data Collection and Processing Systems
SERA	Standardised European Rules of the Air
SES	Single European Sky
SESAR	Single European Sky ATM Research
SM	Safety Manager



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SM ICG	Safety Management International Collaboration Group
SMM	Safety Management Manual
SMS	Safety Management System
so	Safety Objective
SR	Safety Requirements
SOPs	Standard Operating Procedures
SSC	Significant Safety Concern
SSP	State Safety Program
TIA	Telecommunications Industry Association
TLS	Target Level of Safety
QE	Qualified Entity
USOAP	Universal Safety Oversight Audit Programme
WAAS	World Aircraft Accident Summary
WP	Work Package
	Occurrences Categories
ADRM	Aerodrome
AMAN	Arrival Management / Abrupt Manoeuvre
ARC	Abnormal runway contact
ATM/ CNS	Air Traffic Management / Communication Navigation Surveillance
BIRD	Collision / near collision with Birds
CABIN	Cabin safety event
CFIT	Controlled Flight into or toward terrain
CLR	Deviation of ATC Clearance
CLR	Deviation of ATC Clearance Collision with a vehicle, person or aircraft, while aircraft is on the ground.
COL	Collision with a vehicle, person or aircraft, while aircraft is on the ground.
СТОГ	Collision with a vehicle, person or aircraft, while aircraft is on the ground. Collision with obstacle(s) during take-off and landing
COL CTOL DMAN	Collision with a vehicle, person or aircraft, while aircraft is on the ground. Collision with obstacle(s) during take-off and landing Departure Management
COL CTOL DMAN EVAC	Collision with a vehicle, person or aircraft, while aircraft is on the ground. Collision with obstacle(s) during take-off and landing Departure Management Evacuation
COL CTOL DMAN EVAC EXTL	Collision with a vehicle, person or aircraft, while aircraft is on the ground. Collision with obstacle(s) during take-off and landing Departure Management Evacuation External load related occurrence
COL CTOL DMAN EVAC EXTL F-NI	Collision with a vehicle, person or aircraft, while aircraft is on the ground. Collision with obstacle(s) during take-off and landing Departure Management Evacuation External load related occurrence Fire /smoke (non-impact)



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GCOL	Ground collision
GTOW	Glider towing related event
ICE	Icing
IS	Inadequate Separation
LALT	Low altitude operation
LOC-G	Loss of control ground
LOC-I	Loss of control in flight
LOLI	Loss of lighting conditions en-route
MAC	Airprox / TCAS alert / loss of separation / near mid-air collision / mid-air collision
MAC	Mid-Air Collision
OTHR	Other
RAMP	Ground handling
RE	Runway Excursion
RI	Runway Incursion
RI-A	Runway incursion animal
RI-VAP	Runway incursion – vehicle, aircraft or person
SCF-NP	System / component failure or malfunction (non-powerplant)
SCF-PP	System / component failure or malfunction (powerplant)
SEC	Security related
SMI	Separation Minima Infringement
TURB	Turbulence encounter
UAP	Unauthorised penetration of Airspace
UIMC	Unintended flight in Instrument Meteorological Conditions (IMC).
UNK	Unknown or undetermined
usos	Undershoot / overshoot
WSTRW	Windshear or thunderstorm



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Executive Summary

Most promising novel certification process options improving safety were identified within previous ASCOS work. Avoiding unnecessary change and recognising the good approaches already in place, an improved process for safety performance monitoring was developed using recommendations/requirements of ICAO and EU for SMS, as well as, Total Aviation Safety approach. The elaborated monitoring process can be implemented within any of the novel certification options - be it enforcing existing rules, demonstrating safety by achieving objectives or the cross-fertilisation.

A long-term ICAO Global Aviation Safety Plan (GASP) [7] objective already recommends the implementation of predictive risk modelling systems that assure safety in a real-time and collaborative decision-making environment. For the near-term and mid-term GASP expects organisations to implement Safety Management Systems (SMS) and to have appropriate performance indicators, to verify the causal factors and use the alert levels. In the EU, the suggested by ICAO SMS is to be implemented together with a much wider Management System (MS) "to ensure compliance with these essential requirements for airworthiness, and aim for continuous improvement of this system" [24]. The required approach recommends transition from quality management to SMS to develop and to apply skills and practices that account for Human Factors, and continuously reinforce compliant behaviour and risk-based decision-making. The most advanced EASA rules concerning suggested improvements has been issued for aircrew (Part-ARO) and operations (Part-ORO). Yet, the requirements for other aviation sectors will be transposed from generally applicable Part-ARO and Part-ORO.

ASCOS performance based monitoring process (refer to 2.1) uses the Continuous Monitoring Approach (CMA) as an integral part of the stakeholders' life cycle processes for the purpose of the Safety Assurance SMS component.

The most promising data sources (refer to 3.3 and 3.4) are raw data obtained by Flight Data Monitoring (FDM) or Flight Operations Quality Assurance (FOQA) fed into a central repository. Either of two approaches to FDM as the source for the SPIs are recommended:

- 1. Central collection of predefined FDM parameters/events
- 2. Central collection of raw flight data

The required significant resources and organisational effort (incompatibility of ECCAIRS) along with the arising concerns (impracticability of raw data, stakeholders' doubts to give up control on their data, 'big brother' syndrome) were the reasons for postponing direct FDM and FOQA data use in favour of indicators (first approach). [43] Also, flight simulator as a source of data for actual Safety Assurance was briefly considered (refer to 3.5).

ASCOS method is based on monitoring of 63 Safety Performance Indicators (SPIs) grouped at four levels (Technology, Human, Organisation, System of organisations) referring to different stakeholders of the Total Aviation System (Aircraft, Airframe, Board Systems, ATC/ATM, Airlines, MRO, etc.). [46]



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The SPIs were linked to causal factors – precursors (refer to Appendix A). The precursors were, then, linked to the stakeholders (refer to Appendix C) and together with the SPIs monitoring could be part of the novel certification process. Since the SPIs do not measure safety directly, quality of the results depends on the inductive reasoning. Information born by the continuously monitored and semi-continuously measured SPIs is transformed assuming the uniformity of nature. The transformation presupposes that a sequence of events in the future will occur as it always has in the past. For a simplified example a past SPI target level of safety (TLS) exceedance linked to precursor 'lack of English proficiency' will, ceteris paribus (no change in English skill), cause the TLS exceedance again. The 'comorbidity' with other SPIs TLS exceedances may lead to one of the Operational Issues. Thus, the historical, lagging SPIs integrated with precursors and Operational Issues possess predictive information and enhance Safety Assurance.

The integration was elaborated in previous ASCOS work [44] - the method of SPI-precursor linking steps. The mentioned 'linking steps' were called 'metaprocess to safety performance monitoring' and they go beyond the monitoring itself, but provide a tool to apply it (refer to 2.2, Appendix B).

An example of a way of using SPIs to assure safety was presented (refer to 2.3).

The control of SPIs no. 1-46 assumes:

- setting Target Levels of Safety (TLS) of SPIs for current period to reach planned objectives (e.g. average and standard deviation from previous year SPIs)
- reacting to every exceedance of TLS by the Safety Manager and the team by development of response plans with the help of precursors
- implementing response plans by the Management and monitoring their results

A group of SPIs (no. 47-63) deal with the System of organisations level. Their application, however, were not recommended due to non-conformity (refer to 4). [43] On the other hand, Safety Assurance within Total Aviation System (TAS) at this level could be controlled by monitoring of supervised organisations safety performance using periodically (e.g. monthly) aggregated SPIs no. 26-44. The underperforming organisations would be identified using descriptive statistics - atypicality distance and hazards could be mitigated using similar to other levels approach (refer to 4.1).

It is assumed that ASCOS performance monitoring is implemented within the framework of management of change (PDCA, refer to 2.1.3) together with other SMS components (refer to 2.4). The SPIs can be promoted, implemented and reported to the ECCAIRS repository using ECCAIRS taxonomy based occurrence reporting system with some minor additions to the taxonomy (refer to 3.2). In most cases, information needed for ASCOS SPIs, is, more or less, already required by the EU directive 2003/42/EC on occurrence reporting in civil aviation (refer to Appendix D). [56]

Appendix E and F provide some general, basic information on ICAO oversight audits, EASA standardisation as well as on the aviation safety databases.



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1 Introduction

The main objective of ASCOS is to develop novel certification process adaptations and supporting safety driven design methods and tools to ease the certification of safety enhancement systems and operations, thereby increasing safety. To achieve this, six measureable and verifiable objectives are defined, each to be addressed in one specific dedicated Work Package (WP):

- 1. To develop safety based certification process adaptations based on analysis of existing certification and rulemaking process and evaluation of different possible new approaches;
- 2. To develop a method and supporting tools for multi-stakeholder Continuous Safety Monitoring, using a baseline risk picture for all the parts of the total aviation system;
- 3. To develop a total aviation system safety assessment method and supporting tools that can be used for safety based design of new systems, products and/or operations;
- 4. To apply proposed certification process adaptations to design systems in case studies, so as to illustrate how the adaptations can be of benefit to operators and manufacturers;
- 5. To validate key results: a) new certification approach, b) method and tools for Continuous Safety Monitoring, and c) all the supporting safety based design systems and tools.
- 6. To inform air transport stakeholders on the proposed certification approach through promotion workshops, supported by exercises and an e-learning web-site environment.

As it was mentioned above, the objective of WP2 - Continuous Safety Monitoring is to develop a method and supporting tools for multi-stakeholder continuous safety monitoring, using a baseline risk picture for all parts of the total aviation system. The stakeholders include air navigation service providers, operators, and manufacturers.

Such a continuous monitoring approach to standardised implementation is also advocated by ICAO [7, 2] and SM ICG [34].

1.1 Task objective

In the context of developing a method and the supporting tools for multi-stakeholder continuous safety monitoring, the objective of this specific deliverable is to develop an improved process for safety performance monitoring in which Safety Performance Indicators (SPIs) for each stakeholder will be linked with precursors for all the main operational issues for commercial air transport operations.

The objectives of this task are also to investigate:

- How Continuous Monitoring Approach (CMA) can be used as integral part of the life cycle processes
 for continued airworthiness of aircraft, and maintenance of certificates for air navigation service
 providers, operators, and manufacturers?
- If and how flight data obtained by Flight Data Monitoring (FDM), Flight Operations Quality Assurance (FOQA) can be used to enhance the safety benefits of a multi-stakeholder CMA in aviation?



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1.2 Research approach

The research starts with a theoretical overview of a process for safety performance monitoring and measuring. The process is one of the twelve elements comprising the ICAO SMS framework and it is part of the ICAO SMS component – "Safety Assurance". The safety assurance process provides confidence that the SMS is operating as designed and that it is effective. In particular it helps the organisation to verify its safety performance, to ensure that the risk mitigation measures are effective and to identify and assess changes and manage the associated risks.

A process of safety performance monitoring and the method improvement is based on the feedback known in the literature as the Deming Circle or PDCA Cycle (refer to 2.1.2).

The purpose of this study is to provide methods needed to implement the process. Special emphasis is given to determine the links between SPIs and precursors for all the main operational issues of commercial air transport operations (refer to 2.2) and the use of data from FDM or FOQA in continuous safety monitoring (refer to 3.4).

1.3 Structure of the document

This document is organised as follows:

- Section 2 contains a description of the process for safety performance monitoring including ICAO and regional principles, process organisation and the relationship with other processes in the SMS framework;
- Section 3 focuses on Safety Data collection, analysis and exchange. This section provides criteria for data quality and a description of a Safety Databases;
- Section 4 contains ASCOS System of organisation level SPIs potential contribution to it;
- Section 5 includes conclusions and recommendations.

The document includes the following appendices:

- Appendix A contains a summary of the analysis of the link existing between precursors and SPIs;
- Appendix B includes complete details of Steps 1 to 8 defined by ASCOS D3.2[44] to identify the links;
- Appendix C is the list of ASCOS precursors associated to the stakeholders;
- Appendix D is the list of ASCOS SPIs confronted with EU directive 2003/42/EC on occurrence reporting;
- Appendix E provides detailed information on ICAO USOAP CMA background and perspectives and a description of the EASA Standardisation process;
- Appendix F provides overview of aviation safety databases.



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1.4 Definitions

Bow-Tie diagram. Such a diagram illustrates a hazard, an undesirable event, safety events and potential outcomes, and risk controls put in place to minimise the risk. Bow-Tie method involves asking a structured set of questions in a logical sequence. [58]

Deviations. Procedural or flight path deviations. A precursor type that may be observed randomly, but could become combined and, thus, result in a major occurrence. [48]

Lagging indicator. Metrics that measure safety events that have already occurred including those unwanted safety events that are to be prevented (SM ICG). [34]

Leading indicator. Metrics that provide information on the current situation that may affect future performance (SM ICG). [34]

Management System (MS). A management system of an air operations pursuant to EC 216/2008 including specific requirements in terms of safety and corresponding to the size, nature and complexity of operator. [19]

Precursor. Identifiable event that may be used as early warning for known or potential hazards. [46]

- Events identified and currently monitored, for which the potential to become hazardous is known to be significant.
- Events not known yet, but for which induced risks may have been initially underestimated therefore not
 enough reduced, neglected or even unidentified up till now, unless revealed by an actual occurrence of
 the hazard.

Safety Assurance. One of four components of the ICAO recommended SMS. These are processes and activities undertaken by the service provider to determine whether the SMS is operating according to expectations and requirements. [6]

Safety Management System (SMS). A systematic approach to managing safety including, the necessary organizational structures, accountabilities, policies and procedures. [2]

Safety Manager. An accountable manager with a direct safety responsibility required within Management System of organisation. [19]

Safety Performance Indicator. A data-based parameter used for monitoring and assessing safety performance. [2]

Safety performance target. The planned or intended objective for safety performance indicator(s) over a given period. [2]



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Safety performance. A State or a service provider's safety achievement as defined by its safety performance targets and Safety Performance Indicators. [2]

Safety Policy and Objectives. One of four components of the ICAO recommended SMS. It outlines the principles, processes and methods of the organization's SMS to achieve the desired safety outcomes. [6]

Safety Promotion. One of four components of the ICAO recommended SMS. It encourages a positive safety culture and creates an environment that is conducive to the achievement of the service provider's safety objectives. [6]

Safety Risk Management. One of four components of the ICAO recommended SMS. It systematically identifies hazards that exist within the context of the delivery of its products or services. [6]

Safety risk. The predicted probability and severity of the consequences or outcomes of a hazard. [2]

Safety. The state, in which risks associated with aviation activities, related to, or in direct support of the operation of aircraft, are reduced and controlled to an acceptable level. [2]

Service providers. The term "service provider" refers to the organizations listed below [7, 2]:

- a) air traffic services (ATS) providers in accordance with ICAO Annex 11 (including AIS, CNS, MET and/or SAR services);
- b) approved maintenance organizations providing services to operators of aeroplanes or helicopters engaged in international commercial air transport, in accordance with ICAO Annex 6, Part I or Part III, Section II, respectively;
- c) approved training organizations in accordance with ICAO Annex 1 that are exposed to safety risks related to aircraft operations during the provision of their services;
- d) operators of aeroplanes or helicopters authorized to conduct international commercial air transport, in accordance with ICAO Annex 6, Part I or Part III, Section II, respectively;
- e) operators of certified aerodromes in accordance with ICAO Annex 14;
- f) organisations responsible for the type design or manufacture of aircraft, in accordance with ICAO Annex 8.

State Safety Programme (SSP). An integrated set of regulations and activities aimed at improving safety. [2]

Uneventful events. A precursor type including events that already occurred. Although the events are being uneventful, they could have a more severe outcome under different circumstances. [48]

Uniformity of nature. The principle used to justify inductive reasoning in scientific research presupposing that a sequence of events in the future will occur as it always has in the past.



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2 Process for safety performance monitoring

2.1 ASCOS Safety Assurance process

A long-term ICAO Global Aviation Safety Plan (GASP) [7] objective is the implementation of predictive risk modelling systems that assure safety in a real-time, collaborative decision-making environment by the Block Upgrades strategy. For the near-term, GASP identifies two objective groups:

- Effective Safety Oversight effective implementation of a fundamental safety oversight in States lacking it;
- Safety Management and Predictive Risk Modelling full implementation of State Safety Programs
 (SSP) in the rest of States followed, in the mid-term, by Safety Management Systems (SMS)
 implementation in organisations.

To facilitate the planning process, the objectives are supported by Safety Performance Enablers: Standardisation (uniformity in implementation), Collaboration, Resources and Safety Information Exchange. The ICAO guidance material suggests [6], that an effective implementation of SSPs and SMSs requires complementing the existing prescriptive safety management with a performance-based approach.

In cooperation with ICAO [11], the EU regulations went further extending the requirements beyond SMS towards an integrated, proportional, flexible and binding across the sector total aviation management system that includes the ICAO SMS components (Safety Policy and Objectives, Safety Assurance, Safety Risk Management and Safety Promotion).

Aligned to global and regional near and mid-term aviation safety objectives and requirements, ASCOS proposes two processes enhancing Safety Assurance component of the SMS.

Firstly, there is a metaprocess that serves as a tool for identification of links among quantifiable Safety Performance Indicators (SPIs), Operational Issues and precursors [44]. It is assumed that metaprocess is done once during ASCOS to identify initial relations, but it would be also done later to update links and identify more precursors for future improvements (refer to 2.2).

Secondly, there is a process for implementation of the Safety Assurance enhanced by ASCOS precursors within a Management System. According to ICAO SMS Manual [6] section 5.3.73 recommendations, ASCOS builds upon the Appendix 6 to Chapter 5 of the ICAO manual by enhancing the SMS component with the metaprocess findings (the links and precursors) (refer to Appendix A).



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2.1.1 Performance-based requirements

ICAO requirements

The calls for implementation of SSP and SMS provisions recommended to global civil aviation in a consolidated effort have lasted at least since 2010 [2]. In 2011, ICAO began the transition of its auditing programme, the USOAP [7], to a Continuous Monitoring Approach (CMA). (refer to Appendix E) The CMA aims to provide a continuous report of effective implementation of SARPs identifying safety deficiencies, assessing associated risks, developing assistance strategies and prioritizing improvements. The main interaction is rooted in safety data collection, analysis and exchange. It is played by two actor categories:

- aviation authorities (overseeing service providers according to the SSP)
- service providers (managing safety through their own SMS).

The ICAO manual specifies the following performance-based requirements for a SSP/SMS [6]:

- The regulator needs to have a process for continuous monitoring of individual product and service
 providers' safety performance. Additional new performance-based processes introduced and duly
 accepted/approved by the regulator, should have appropriate performance indicators developed for
 monitoring such performance-based processes. Such process specific indicators, proposed in the
 project, may be viewed as complementary indicators to the higher level SMS Safety Performance
 Indicators.
- 2. The safety performance outcome from the introduction of performance-based element(s) within or complementary to a SMS framework should not be worse off than an existing purely prescriptive regulatory framework. Where there is a degradation of the system's performance, the service provider should work in conjunction with the regulator to verify the causal factors and take actions as appropriate. Such actions may include necessary modification of the performance-based requirement itself or where necessary, restoration of basic prescriptive requirements.
- 3. Monitoring and measurement of a performance-based process should be done through appropriate performance, quality or safety indicators that continuously track the performance of that process. Parameters for such performance tracking may be occurrence outcomes, deviations or any event types that reflect the safety, quality or risk level of the process. A data trending chart should be used to track such outcomes. The alert level setting will effectively serve as the demarcation line between the acceptable trending region from the unacceptable region for a safety indicator.
- 4. The assessment of a performance-based process would require the assessor to be aware of the context of that process element within its overall regulatory framework as well as the complexity of the audited organization (the acceptability of a hazard reporting system or acceptability of proposed target alert levels for a performance-based process). It may involve more (than in the prescriptive method) interaction, monitoring, negotiation and objective judgment for the auditor.



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Regional requirements

The SMS suggested by ICAO is not compulsory in European Union. In fact the regulations require a much wider Management System (MS) "to ensure compliance with these essential requirements for airworthiness, and aim for continuous improvement of this system" [24]. Yet, European regulations follow ICAO recommendations (e.g. ICAO Annex 13 Chapter 8 Accident prevention measures) and foster regional arrangements in using standardized formats to facilitate safety data exchange. Regional coordination is, also, planned by the EASA European Aviation Safety plan (EASp) within a system of two-way dialog where SSPs of the Member States are supposed to, gradually, get aligned to EASp and follow the paradigm shift to pro-active approach [28].

A new Management System is the subject of a stand-alone approval, its implementation is assessed as part of the normal initial certification and oversight processes. The existing organisation certificates are generally "grandfathered", i.e. they are automatically approved. The MS "components" are, also, subject to the procedures of existing bilateral agreements. A standardized approach has clearly defined lines of responsibility and accountability according to safety policy in identification of hazards, evaluation and mitigation of risk by competent personnel and recorded within documentation system. Emerging civil aviation regulations [18,19] place obligations on enabling transition from quality management to SMS with Safety Manager or Safety Review Board responsibilities complementary to and as significant as e.g. finance management that includes, among others, performance monitoring, too.

The assessed "riskiness" of an organisation and its risk management capabilities influence the level of oversight applied, i.e. the oversight programme is established based on the assessment of performance-influencing factors, organisational changes and other safety performance indicators. The requirements of emerging regulations favour service providers showing a high-performing MS and clear safety leadership.

The MS requirements are recommended to all certified organisations allowing for maximum interoperability. The general principle is that all organisations that may have an impact, directly or indirectly, on the safety of flight, need to do their part in terms of hazard identification, safety reporting, risk assessment and mitigation. EASA-promoted "Integrated management" enables managers to recognise and take into account all significant influences on their organisation (in case of SMS – Safety Policy and Objectives, Safety Risk Management, Safety Assurance and Safety Promotion):

- The newly forged and binding EU rules for authorities within Part-ARO and Part-ARA [18,19], indirectly address EASp/SSP implementation in order to avoid any impacts on plans already implemented in terms of: oversight functions;
- personnel qualification;
- handling safety-critical information;
- authorisation;
- surveillance;
- resolution of safety concerns.



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According to the regulations competent authorities are obliged to establish their MS that include "Internal audit and safety risk management". It is recommended to use best practices for record keeping and running register of approved organisations and envisioned for standard planning cycle of 24 months (with possible extension to 36 or 48).

As a part of a single network the requirements for authorities are interpreted and applied in a standardised manner [15], not less and not more than required by Community law, and taking "into account ICAO Doc 9735 — the USOAP continuous Monitoring Manual" (refer to Appendix E).

MS of an organisation pursuant to the regulation EC 216/2008 is a total aviation management system. It means a service provider needs an integrated, proportional, flexible approach and the same requirements are binding across the sector. Therefore, MS required by European Union regulations exceeds the scope of SMS described by ICAO Annexes.

The most advanced EU legislation concerning the SMS standards in MS is in the area of aircrew and operations regulations (Part-ORO and Part-ORA) [18, 19]. The "soft law" of Acceptable Means of Compliance and Guidance Material of Subpart GEN to the regulations provide suggested details. The philosophy, in general, requires developing and applying skills and practices that account for Human Factors, and continuously reinforce compliant behaviour and risk-based decision-making.

The Air Navigation Systems of Single European Sky States are bound by the Common Requirement of a performance scheme [14] to improve overall efficiency (including safety) in line with the Performance Framework of the European ATM Master Plan. Previously the ESARRS (EUROCONTROL Safety Regulatory Requirements) and the use of tools and guidance provided by EUROCONTROL (e.g. the TOKAI system for the investigation of occurrences) were considered as best practice or a minimum requirement. The improvement of the ANS Risk Picture is developed under SESAR WP16-Safety Management and Safety Assessment [40].

Until the entry into force of the corresponding EU Regulation, the national rules in place (following ICAO Annex 14) apply to the management systems (that include SMS) of aerodromes.

The EU rulemaking concerning Part-21 organisations (Design and Manufacturing), as well as, Part-M (maintenance), Part-145 (continuing airworthiness management organisations) and Part-147 (maintenance training) focus on compliance to quality system and they have not yet been amended in terms of the new Management System requirements. Yet, the requirements will be transposed from generally applicable Part-ARO and Part-ORO developed for aircrew and air operations.

2.1.2 A management system and ASCOS enhancement

The main elements of aviation organisation current management system emulate typical management system requirements:

- · documented policies and procedures;
- sufficient and adequately qualified personnel, including the obligation to plan the availability of personnel;



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- nomination of management personnel for the different areas of activity;
- adequate facilities and accommodation;
- a function to monitor compliance of the management system, including nomination of a person or group of person responsible for the compliance monitoring function;
- the need to ensure that certification and oversight tasks performed on behalf of the competent authority are conform to the applicable requirements;
- a system to identify changes that affect the management system and to take action to ensure it remains effective;
- a system of record-keeping to ensure traceability of activities performed.

ASCOS proposes a method for enhancing the management system by safety performance monitoring focused on Total Aviation System. The method is based on monitoring of 63 SPIs [43] linked to causal factors – precursors (refer to Appendix A) and offers a way of using them to assure safety (refer to 2.2.4). The control of SPIs no. 1-46 assumes:

- setting target levels of SPIs for current period to reach planned objectives
- reacting to every exceedance by the Safety Manager and the team by development of response plans using identified precursors
- implementing response plans by the Management and monitoring their results

The SPIs no. 47-63 deal with the system of organisations level and are offered for further consideration as they require more changes to the current situation (refer to 4.4).

The method allows for transforming historical lagging signals and using them together with leading signals in pro-active prevention. The transformation presupposes that a sequence of events in the future will occur as it always has in the past. E.g. past SPI TLS exceedance linked to precursor 'lack of English proficiency' will cause the exceedance again and concerted with other SPIs exceedances may lead to one of the Operational Issues. Thus, the historical, lagging SPIs integrated with precursors and Operational Issues (refer to 2.2.3 and Appendix B) possess predictive information and enhance Safety Assurance. The integration was elaborated by previous ASCOS work [44] - the method of SPI-precursor linking steps. The mentioned 'linking steps' were called 'metaprocess to safety performance monitoring' and they go beyond the monitoring itself, but provide a tool to apply it.

The reported SPIs aggregates could be further analysed following the inductive reasoning in terms of trends.

Moreover, data points (as SPIs, FDM data, or even precursors if collected, even partially) could be placed into distinct categories, often of a qualitative nature (precursors) and thus fall into a category, commonly described as "discrete choice" data. An entire class of models is available to analyse discrete choice data. For example variance-based probability models like the logit models:

- ordered logit (which recognises an inherent ordering in the categories)
- multinomial logit (which do not recognise any ranking among choices)



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Provided large enough random samples are available, such probability models of occurrence and factors sensitivity analysis could be applied to examine Operational Issues from a statistical perspective.

The 2012 FAA report [54] represents a first in the US, regression-based analysis of occurrence data (10,408 runway incursions collected by the FAA Runway Safety Office RI database). The results are suggestive rather than definitive. For example, controller incidents appear to be more severe on average. The report concludes further investigation specifically in understanding the frequency of incursions and improvements to the severity measure.

2.1.3 Process organisation

The proposed organisation of the ASCOS process for safety performance monitoring is based on the Deming cycle (Plan-Do-Check-Act) [34]. The steps defined in the process are as follows:

1. Designation of responsibilities

A company implementing a Management System defines general aspects of the organisation that need to be measured and controlled using a subset or total set of the ASCOS SPIs. The designated personnel responsible for introduction of the SPIs should include safety and quality management specialists with practical experience. Timeline and milestones need to be elaborated and regularly monitored.

2. Review of safety policy and objectives

Safety management policies need to be reviewed in the context of current EASp/SSP documents. Each Safety Performance Indicator should have a target or threshold above which action will be taken. In addition the organisation may have objectives regarding the implementation of SPIs. Mitigation plans based on the precursors linked to SPIs are to be developed and ready to be used or modified and use when TLS of the indicator is exceeded. Documentation of the assumptions that are taken into account when assessing risk of hazards should be created for future reviews. For other details concerning a mitigation plan development refer to, for example, the EHEST SMS Emergency Response Plan [31].

3. Definition of indicators and their specifications

The SPIs specification needs to be elaborated, including metadata allowing for determining its meaning as well as data quality and source. Quantitative indicators have advantage over qualitative ones in that they can be compared and allow detecting trends and deviations from the expected performance. This feature is important to the ASCOS method in transforming historical lagging SPIs into leading signals. Yet, qualitative indicators can be used to enrich later analyses and in support of the quantitative SPIs.

4. Determining data requirements

Data already available in the organisation need to be reviewed and checked with the needs to determine what additional data is needed and how it can be obtained to satisfy SPIs reporting. The key consideration is data quality, especially reliability and validity.



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5. Collection of information

Having chosen the indicators, the next step is to establish data collection process, determine the sources, how the data is stored, format in which it will be reported.

6. Analysis of the results

Since the SPIs do not measure safety directly, quality of the results depends on the inductive reasoning. Assuming the uniformity of nature, presupposing that a sequence of events in the future will occur as it always has in the past, the SPIs, integrated with precursors and Operational Issues in an elaborated metaprocess presented below (refer to 2.2) possess information that could be used to proactively improve the organisation's processes and procedures to enhance the safety and quality of the operation. In other words, by the mentioned assumption, a leading SPIs (i.e. comprehensive analysis of the organisations grouped in System of organisations level of SPIs) and the rest, historical, lagging SPIs are logically located a priori to the EASp Operational Issues (GCOLs, LOC-I, CFIT, MACs, REs). When SPIs' TLS are exceeded, an adequate, previously prepared mitigation plan is to be confronted with the "real" (relevant in the considered situation and period) precursors discovered during investigation (supported by e.g. FDM data) and modified. The "real" precursors lists are the ASCOS precursors (refer to Appendix C), but their particular validity is verified during investigation.

Bow-tie models contain events which can be quantified or associated with FDM parameters and occurrence reports from voluntary reporting programs

However, a different, more real-time or automated approach to provide Safety Assurance than the ASCOS process.

FDM data is continuously updated (on the contrary to the semi-continuously updated SPIs), but even FDM data provides lagging information when it finally becomes available, together with the SPIs, to Safety Manager and his team for analysis and, possibly, risk mitigation in the future.

7. Response to findings

The management reviews the precursors regularly and make decisions to take corrective actions if needed. The pool of the identified "real" precursors should be treated as a kind of "soft" primary cause, directing the Safety Manager towards the best response to arising risks after further investigation. Implementing the mitigation plans should be undertaken in correspondence to Safety Risk Management (risk avoidance, reduction, transfer, assumption, and risk exposure segregation) and its tools (e.g. Bow-Tie diagram). [58] The results and actions taken should be communicated to the staff. Failing mitigation plans are evaluated, improved and implemented again. The SPIs are periodically reported to a European data repository.

8. Evaluation and correction of SPIs

The SPIs and their specification should be reviewed regularly. Validity of used indicators should be evaluated with experience gained as well as upcoming changes in internal and external environment of the organisation.



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After a chosen period, for example the one corresponding to the EASA standard planning cycle, the SPIs-precursors linking list should be updated (refer to 2.2) and the management system should be reviewed.

By implementation of the process, the Safety Assurance component will be transitioned from prescriptive to performance-based safety management rooted in quantifiable SPIs and enhanced by the ASCOS precursors (refer to Appendix A) and their method of application within MS.

2.2 Internal structure of the metaprocess of SPIs and precursors links identification

To be more informative on the representation and the evaluation of the emerging/future risks, the semi-continuously updated SPIs need to be linked to concrete information where the significant problems arise and for what reasons. 'Semi-continuous update' meaning periodical aggregation of the SPIs events, refers to ASCOS D2.1 [43]. ASCOS D3.2 [44] prepared a metaprocess to enable the safety performance monitoring and its continuous improvement within a MS. The metaprocess identifies links between SPIs and precursors leading to the Operational Issues.

2.2.1 Safety Performance Indicators

A list of SPIs was defined in ASCOS D2.1[43] at four different levels:

- Technology (lagging);
- Human (lagging);
- Organisation (lagging and leading);
- System of organisations (lagging and leading).

Leading indicators are identified through comprehensive analysis of the organisations. They are associated with organisational and managerial issues which are difficult to quantify and whose relation with accident risk is not so obvious. In order to facilitate the quantification, the comparability and the automatic detection of safety occurrences, the proposed framework of SPI deliberately excluded any leading indicators, giving priority to the lagging indicators, due to the fact that it is easier to both measure and analyse them based on objective criteria. [43] A System of organisations level (including leading SPIs) is considered in Section 4.4 ASCOS safety performance monitoring process for system of organisations (refer to 4.4).

The lagging SPIs concern already happened events and represent actions previously taken by the aviation system operators in the context of the EASp Operational Issues [43]. Their use is limited to the analysis of historical records with the aim of prevention of future Operational Issues.

Figure 1 presents considerations on the availability of emerging safety information in relation to a timeline for possible action. During the post flight operation phase the Safety Manager and his team use the process as described above (refer to 2.1.3), that includes lagging indicators, historical information and the precursors, and prepare a reaction to provide Safety Assurance of future operations. They are not able to provide a real-time



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reaction to emerging issues in flight operation (i.e. while flying, taxiing, taking off, landing), because these data are not available to them at the time of event occurrence.

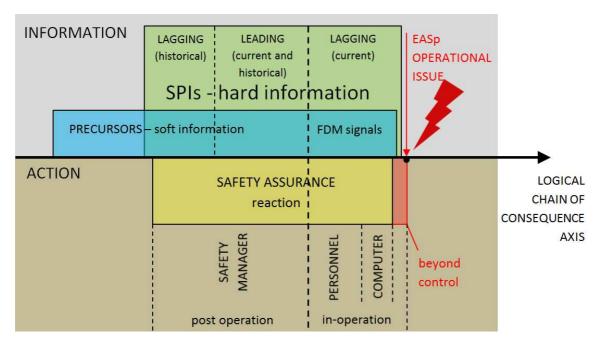


Figure 1 Safety Assurance using SPIs and precursors

A more direct impact on Safety Assurance while in the flight operation phase remains "in the hands of" operating personnel and automatic systems control. FDM data is continuously updated (on the contrary to the semi-continuously updated SPIs), but even FDM data provides lagging information when it finally becomes available, together with the SPIs, to Safety Manager and his team for analysis and, possibly, risk mitigation in the future.

The SPIs were linked to the Base Events of the Causal Model for Air Transport Safety (CATS) V0.1 for ASCOS grouped in the EASp Operational Issues:

- Runway Excursions (RE) while take-off and while landing
- Mid-Air Collisions (MAC)
- Controlled Flight Into Terrain (CFIT)
- Loss Of Control In flight (LOC-I)
- Ground Collisions (GCOL)

2.2.2 Precursors

A list of precursors, characterised in ASCOS D3.1[46] and presented in ASCOS D3.2[44] (about a dozen as examples), was massively populated, up to 500 different precursors (refer to Appendix C). The new precursors, including occurrences (uneventful events), as well as deviations were identified using the following rules:



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- a. Precursors should be identifiable at one of 4 levels corresponding to the SPIs levels:
 - Human (human errors, lack of adherence to procedures, pilot incapability, etc.)
 - Technology (system failures, malfunctions etc.)
 - Organisations (e.g. workload distribution)
 - System of organisations (requirements definition, regulations, etc)
- b. Precursors should be semantically separable (there should not be precursors which cover the same event, even partially)
- c. Set of defined precursors should exhaust the specified range of factors identified as influencing the safety (e.g. adverse weather)

2.2.3 Application of the method for linking precursors to SPIs

Please refer to ASCOS D3.2 for a detailed description of the method [44]. Step 1 was completed by ASCOS D3.2. Starting from Step 2 of the method precursors are gradually incorporated into the model. During the most intensive effort of the Step 6 they were linked to the Base Events of the Causal Model for Air Transport Safety (CATS) V0.1 for ASCOS.

- Step 1 Association of CATS Event Sequence Diagrams (ESDs) to EASp Operational Issues
- Step 2 Association of precursors (occurrences, deviations) and defences/controls when possible.
- Step 3 Linking of updated precursors list (occurrences, deviations) and CATS ESDs initiating events.
- Step 4 Linking of defences/controls updated list and CATS ESD number
- **Step 5** Linking of defences/controls updated list and CATS ESD safety barriers
- Step 6 Linking of precursors and CATS Base Events

Steps 3-6 were carried out in D3.2 [44] for the seven CATS ESDs(#1,2,3,4,5,9,10) as an example. These Steps were continued and completed until ESD #37 (for Step 6) in this document, ASCOS D2.3.

- Step 7 Linking of CATS ESD Base Events and 63 ASCOS SPIs
- **Step 8** Linking of precursors and SPIs. This Step was finalized by merging Step 6 table and Step 7 table results at the same, corresponding ESDs Base Events. The result was later refined by the application of a conditional sum of sets of precursors to eliminate the uninformative duplicates of links (for more details please refer to Appendix A in this document).

The resulting table of SPIs, precursors and indicated Operational Issued is located in Appendix A (Appendix A.pdf).



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2.3 An example of ASCOS enhanced Safety Assurance

For the purpose of this example, the analysis was limited to one lagging SPI only. Yet, individual SPIs are not expected to be very informative. Usually several of the SPIs have to be considered and looked upon from the Management System perspective as well as using statistical inference (refer to 4.1).

Consider a simplified example of Safety Assurance within MS using one SPI – Technology level SPI no 7 "Rate of landing gear system failures/flight" (refer to Appendix D). The event measured by SPI7 may lead to Runway Excursion during landing.

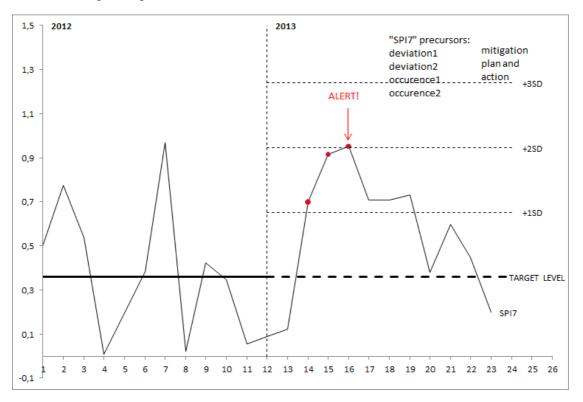


Figure 2 Safety performance monitoring, one SPI example (X-axis: periods=months since implementation of MS, Y-axis: SPI7 rate in 1000s monthly aggregated at a service provider level)

As suggested by ICAO SMS Manual, a point average of 2012 SPI7 data was chosen (refer to Figure 2) to use as a TLS for 2013 safety plan of the organisation. The alert of growing risk of Runway Excursion during landing was triggered during 16th period by 3 consecutive points above the 1 SD (Standard Deviation) line.

The practical approach to respond to this exceedance could for example follow the Eight Disciplines Problem Solving approach [13] (8D: Plan; Use a Team; Define and describe the Problem; Develop Interim Containment Plan; Determine, Identify, and Verify Root Causes and Escape Points; Choose and Verify Permanent Corrections (PCs) for Problem/Non Conformity; Implement and Validate Corrective Actions; Take Preventive Measures; Congratulate Your Team). Another approach to such an exceedance can be found within the safety



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management toolkit like the one suggested by EHEST for Non-Complex operators [31]. However it could be generalised as presented in the Table below.

SPIs ALERT!		SPIs		Mitigation		Mitigation plans		Effects
(TRL		precursors		plans		implementation:		evaluation
exceedance),		investigation:		validation:				(consecutive
Risk of:								period SPIs
								acquiring):
Operational	>>>	precursors:	>>>	Plan1	>>>	Validated plan1	>>>	SPI1
Issue1		Occurrence1		Plan2		Validated plan2		SPI2
Operational		Occurrence2		Plan3		Validated plan3		SPI3
Issue2		Deviation1						
		Deviation2						SPIn

Table 1 The generalised example of practical use of the ASCOS SPIs and precursors

The ASCOS precursors linked to SPI7 give the Safety Manager of the organisation starting points to adapt to the current situation and to improve the mitigation plans in case of the SPI7 target exceedance which were prepared during the Management System implementation (or change) phase at the beginning of the planning cycle. The mitigation plan modification is adapted through the Root Cause Corrective Action (RCCA) meetings that provide resources, necessary soft and hard knowledge, as well as analytical and decisive manpower to "eliminate the causes of nonconformities". The Safety Manager initiates a series of RCCA meetings inviting managers of every department of the organization to explain the identified hazard and to develop a mitigation plan with the hazard response team. Managers or delegated workers (equipped with adequate powers) join the hazard response team. The team gathers timely information and sends it to the Safety Manager, who uses it to flag which precursors of the ASCOS model were "real" (relevant) in the considered situation and period (see example below).

SPI7: Rate of landing	ASCOS model precursors –	Post investigation "real"
gear system	uneventful events (occurrences)	precursors
failures/flight	Hard landing	Chief of pilots: Yes, a group of pilots confirm several hard landings
	Bounced landing	No
	System failure affecting aircraft configuration, controllability and/or flying qualities	No
	Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly	No
	Convective weather / turbulence / windshear / crosswind encounter during approach and landing	No
	Convective weather encounter	Operations Officer: Yes, the surprise convective weather has been encountered many times for last three months.
	(more)	

CDIZ Data affaration	ACCOC	David 1
SPI7: Rate of landing	ASCOS model precursors –	Post investigation "real"



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gear system	deviations	deviations
failures/flight	Flaws in maintenance technician / airworthiness specialist / requirements definition process and/or training methodology	No
	Maintenance technician / airworthiness specialist - Inadequate workload distribution	No
		Fleet Roster Officer: Yes, flying personnel is exhausted. We have not enough crew to
	Pilot tiredness - Inadequate workload distribution	keep rotations going in our net.
	Flaws in pilot requirements definition process and/or training methodology	No
	Flaws in design of maintenance processes	No
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements	No
	Flaws in manufacturer quality control process	No
	High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,)	No
	Late deceleration and configuration set-up for approach and landing	No
	Unstabilized final approach (high, fast, steep,)	No
	Lack of adherence to emergency procedures	No
	Lack of adherence to SOP in terms of approach and landing	No
	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	No
	Tailwind component above limit	No
	Aggressive maneuvering / overcontrolling	Cpt. Smith: Yes, I happened to overcontrol the B737 during approach at EPWA, several times, lately.
	Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	No
	(more)	

Table 2 An example of SPI7 associated precursors list and the post investigation "real" precursors

The precursors are a list of potential causes that are evaluated in the team to determine if they are relevant in the current case and if positive, mitigation is developed for the "real" precursors.

As it is seen in the example above, a living positive safety culture (revealing crucial information voluntarily) is an important condition of Safety Assurance enhanced by ASCOS safety performance measurement method. The culture needs to be supported by organisations' Management Systems and Safety Promotion in particular.

The RCCA team uses post investigation "real" precursors (Table 2), ASCOS defences and corresponding regulations to modify the mitigation plan and presents it at the next RCCA meeting. E.g. "In order to avoid the arising safety risk the hazard response team suggests the following:

- organise additional training for pilots focusing on Aggressive manoeuvring / overcontrolling during landing adjust personnel skills to Part-ARA requirements;
- new flying personnel hire positive Financial Department opinion;



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• improve weather warning systems on board – adjust aircraft to Continuing Airworthiness Requirement".

The management considering the post-investigation safety mitigation plan can take action and can issue adequate instructions. However, some of the discovered safety issues may go beyond service provider level requiring Civil Aviation Authority assistance (e.g. renegotiation of bilateral agreements due to different levels of ICAO requirements conformity among States to be flown from/to, changes to obligatory training procedures). At the end of a certain period the organisation reports all its SPIs levels to a European database. The undertaken actions allow for SPI7 reduction aiming at current TLS. If, despite undertaken actions, operational issues occur anyway, then RCCA should be repeated. The SPIs may be redefined at the end of the next planning cycle. The alert levels should be reset during next planning cycle. Early signals of an operational issue (i.e. historical lagging SPIs trends and historical/current leading SPIs trends) allow for avoiding the operational issues by developing and implementing adequate actions. The safety level is monitored and preventive/corrective action is taken in order to prevent that an Operational Issue (accident or incident) occurs.

2.4 Relationship with other components of the SMS framework

The Safety Assurance component addressed in this document needs to be implemented within a Management System and needs to support the remaining components of the SMS [44]:

- Safety Policy and Objectives it is a senior management commitment to embed ICAO SMS SARPs in a
 way to ensure compatibility within the framework of an organisation activity. Safety Assurance
 provides feedback signals for improvements of policies and objectives as well as regulations.
- Safety Risk Management it includes hazard identification, safety risk assessment and the implementation of appropriate mitigation measures. Service providers ensure that the safety risks encountered in aviation activities are controlled in order to achieve their safety performance targets. In other words it enables decision makers to set priorities by the hazard identification based on a combination of reactive, proactive and predictive safety data collection methods and to decide if organisation needs to mitigate risk, to schedule performance of a safety assessment or to perform no action. Controlling risk is done by placing barriers. [58]
- Safety Promotion managers lead by example, training and effective communication in conversion of
 an organisation to and in maintaining a positive safety culture. In the Safety Assurance context it
 could be the following: voluntary and non-punitive divulging information about off-nominal safety
 related events, clear separation between acceptable and unacceptable actions, effective, quick and
 smooth adaptation to mitigation, willingness to change, protection against political pressure, cultural
 conventions, chance and 'big brother' syndrome. The better the safety culture, the more efficient the
 Safety Assurance will be.



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3 Safety Data Collection, Analysis and Exchange

3.1 Criteria for data quality

The type of safety data to be collected may include SPIs concerning number of accidents and incidents, events, non-conformance or deviations and hazard occurrences. Data collection needs to use existing reporting infrastructure, notably the ECCAIRS reporting system. The quality of the data that is used to enable effective decision making must be considered throughout SSP and SMS development and implementation. The proposed data collection is a proactive approach that would complement the reactive approach. To determine how safe the system needs to be, Safety Objectives (SOs) are specified on the basis of an overall TLS. A SO is a qualitative or quantitative statement that defines the maximum frequency or probability at which a hazard can be accepted to occur. To determine how safe the system can be, the SOs are apportioned into Safety Requirements (SRs) for each of the hazards and causes underlying an event for which a SO is specified. This may subsequently be used by manufacturers and operators as guidance in a certification process. ASCOS's proposed method follows exactly the same process, but derives the proposed TLS, SOs, and SRs from the existing quantified CATS. A possible approach for the setting of Safety Objectives and Safety Requirements to be used in the design phase is as follows:

- 1. Define the system, product or operation (including assumptions, limitations, etc);
- 2. Identify relevant incident/accident and accident avoidance scenarios;
- 3. Select Event Sequence Diagrams (ESDs) from CATS and the IRP that are valid for the system, product or operation;
- 4. Modify or update the selected ESDs, if deemed necessary;
- 5. Develop and quantify ESDs for scenarios unique to the new system, product or operation;
- 6. Select, modify and/or develop and quantify FT for each of the events in the ESDs;
- 7. Derive a proposed TLS of Safety for the overall risk probability;
- 8. Derive SOs for each end-event in all the ESDs for the new system, product or operation;
- 9. Derive Safety Requirements for each of the hazards and causes represented in the FTs.

Key point: In any process the quality of the input (in this case data) will have a direct bearing on the potential quality of the output. Prior to implementation, ASCOS should take into consideration the less than perfect quality of input that is likely to be encountered. The analysis is supplemented by data quality criteria [35]:

1. Data validity

The validity of data means it is correct and in the absence of errors. The lack of validity is misleading. Errors are likely to appear due to mistakes in data entry which is difficult to avoid in gathering large volume of data.

2. Data completeness



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Completeness measures how much of the data is gathered versus how much of the data is needed for specific purpose (e.g. analysis). The needs must be defined to assess data completeness. Achieving full completeness may by expensive and is not always possible.

3. Data Timeliness

Timeliness means that the data is up-to-date. The more recent the data, the better. In optimal situation, the real-time data are available.

4. Data Availability

Data availability in time measures how much data can be obtained when needed. Redundancy can improve data availability.

5. Data Accuracy

The accuracy measures to what extent the data describes real objects or events. Accuracy depends on the means used to measure objects.

Collected data need to be created and stored in a standardized format to facilitate data exchange and analyses for continuously monitored safety.

3.2 Evaluation of feasibility and implementation issues related to proposed processes of safety performance monitoring in ECCAIRS Reporting System

3.2.1 Feasibility of the proposed processes of safety performance monitoring

As indicated in the scope of the ASCOS project the tool for Continuous Safety Monitoring to be developed in sub task 2.4 will focus on measuring the SPIs defined in the other subtasks of Work Package 2 in ECCAIRS compatible repositories. Given this particular scope, the high number of SPIs and the limited areas of concern for which SPIs have been developed some considerations are made regarding the implementation of the tool(s):

- The tool(s) should be focused on monitoring occurrence data from an ECCAIRS 5 compatible repository. Which actual repository to be used in the long term and how access to this repository can be obtained are questions considered outside the scope of sub task 2.4. This approach avoids that possibly cumbersome political/strategic discussions on this subject will consume resources better spent in the development of the tool.
- Considering that the SPI definitions may be subject to reconsiderations and alterations, the tool to be
 developed should be kept as flexible as possible so can be easily deployed using the same
 mechanisms for a different (set of) SPIs possibly in other areas of concern.



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 Where possible usage will be made of existing analytical means which are part of, or linkable to, the ECCAIRS Reporting System. Building on top of existing and usable technologies will offer the best efficiency. The approaches and algorithms used should not be restricted to an ECCAIRS environment and will be described on a general level.

• Given that the limited timeframe of the ASCOS project, the amount of new occurrence data available for analysis will be small. For this reason the tools to be developed should be able to also use historical data to perform a monitoring of SPIs during a to be defined time frame in the past.

Indicators to be considered within the context of ASCOS have been defined in Deliverable 2.1 "Framework Safety Performance Indicators" and are available in the list of SPIs at the end of this document (refer to Appendix D). Note: the breakdown by areas of concern is that used in Deliverable 2.1.

An evaluation of the proposed indicators was carried out to determine to what extent they could be developed taking into account the current ECCAIRS taxonomy. Based on this evaluation, the issues related to the following indicators were observed:

- Technical related to the failures of critical systems other than installed on aircraft such as rate of aerodrome de-icing facilities failure/flight. This indicator specifically refers to the "failure of the de-icing facilities" but airport ground radar or navaids systems also can be pointed. The current ECCAIRS taxonomy does not provide for a classification of the failure of the facilities but only for a classification of an issue related to de-icing which could be either an issue with the facilities or with the use / operation of the facilities and related services.
- Human Rate of deviation from localizer/approach: The current ECCAIRS taxonomy does not have a
 specific descriptive factor that covers deviation from localizer. A more general descriptive factor
 "glide path" is at hand.
- Human Rate of ground spoiler failure to deploy/landing. The text would indicate that there was a failure of the spoiler system while the context would indicate that the crews failure to arm / deploy the spoiler should be captured. It is recommended to clarify the text of this indicator.
- Human Rate of navigational errors which result in a loss of separation with terrain/flight. This
 indicator required the presence of a navigation related event followed by an event indicative of a near
 CFIT (e.g. too close to ground etc). The issue here is to ensure that the occurrence data is properly
 structured providing not only the event related to navigation but also the aspect of "near CFIT".
- Human Rate of incorrect flight crew response to TCAS RA warnings/warning: ECCAIRS provides for
 the recording of a TCAS warning related event, the incorrect crew reaction, however, is covered with
 a different attribute "crew reaction to TCAS". The two attributes need to be combined for the
 development of this indicator.
- Human Rate of incorrect flight crew response to EGPWS warnings/warning: Similar to the TCAS
 warning and related action, the EGPWS warning itself is captured as an event, while the details of the
 crew's reaction to the warning are captured in a different attribute. The two attributes need to be
 combined for the development of this indicator.



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- Human Rate of loss of separation events/flight. While the ECCAIRS taxonomy provides an event type
 for the "loss of separation", consideration should be given to limit this to those "loss of separation"
 events where there was a risk of collision.
- Human Rate of misuse of automation events: A definition the term "misuse of automation" is required.
- Human Rate of near-stall events/flight: This is interpreted as occurrences in which a genuine stall warning was triggered.
- Human rate of ground movement errors/flight. It is understood that here navigational issues of aircraft moving on the ground are implied. Considering that the suggested rate related to "flight" errors of movements of ground vehicles will not be counted.

Based on the evaluation, the number of those events that are used to calculate the rates of the proposed SPIs listed above can be counted using ECCAIRS taxonomy based occurrence reporting system. Some minor additions to the taxonomy – providing more detail in respect to the "deviation from glide slope" - could be suggested to the ECCAIRS Taxonomy Working Group. This should not be a major issue, as only additional detail under an existing event type would need to be added to the taxonomy, thus no re-classification of old data would be required.

In order to develop related rates, access to matching exposure date (number of flights) would be required. Sources for such data would need to be developed. As mentioned already in ASCOS D2.1[43], it should be investigated whether the EASA Data Warehouse could be used for this purpose.

In principle, it would thus be feasible to develop and maintain the proposed indicators. Nevertheless, issues related to implementation continue to exist and would need to be resolved.

3.2.2 Implementation issues related to proposed processes of safety performance monitoring in ECCAIRS Reporting System

Access to relevant data

The proposed safety indicators are based on occurrence and matching exposure data.

In order to count the relevant event types listed above, an ECCAIRS compatible database is required into which all relevant occurrences are inserted. In principle such database is at hand – the European Common repository (ECR). In it occurrences from all States of the European Union and the associated States (Norway, Iceland, Switzerland and Liechtenstein) are integrated continuously. At the time of writing this report, occurrence data integration is based on EC 1321/2007[20]. The dissemination of integrated data is governed by EC 1330/2007[21].

Both regulations are under review. Based on the draft, the ECR will continue to exist in the future. Access will be simplified for some actors in the aviation system. Additional measured aimed at improving the quality of the reported data are also being considered.



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In the context of ASCOS, it would be safe to assume that the occurrence data from the ECR will be available for analysis to an entity entrusted to carry out the work of maintaining the proposed SPIs.

In regards to access to matching exposure data, the matter appears to be more complicated. Data in the ECR not only relate to the occurrences occurring within the Reporting States, but also to aircraft registered in or operated by the Reporting States. Thus, while for the EU States data on the number of commercial flights in Europe should be available through the related database in EUROCONTROL, the matching information regarding the number of flights carried out outside of Europe is not known.

There are commercial exposure data providers that collect data on the number of flight by aircraft type, but such commercially available data is not complete as not all operators provide related information. Estimates may be available only. Other complications arise from copyright considerations. It would be left to the entity entrusted to maintain the safety indicators to make the appropriate arrangements to obtain access and to integrate the various exposure data sources for analysis.

Data quality

By definition data analysis is based on data. Thus, if no data is present or the data reported is incomplete or incorrect, the analysis will fail to provide reliable results.

Data issues that would have an impact on ASCOS would relate to the non-reporting of occurrences, the incomplete reporting of relevant background data, such as the aircraft type, and the inconsistent reporting of the occurrence scenarios through occurrence categories and event types as well as issues related to the duplication of reporting resulting from the various interacting players having their own reporting systems but integrating their individual reports into a common repository.

Given that that reporting of mandatory occurrence data is governed by legislation, one could assume that the law abiding aviation industry will provide the reports required. Nevertheless, it would help to instil confidence in the process if the reporting of a State to the ECR would be included in the EASA standardisation activities.

The issue of incomplete or late reporting is known to the rule makers and the industry. Since years, the reporting to the ECR has been monitored and gaps in reporting have been publicized by the JRC and EASA. One of the goals of the proposed new regulation on occurrence reporting is to "Ensure that data issued from reported occurrences and stored in the national databases and in the ECR <u>are complete and of high quality</u>" [23]. It seeks to improve the data quality by making several data attributers "mandatory", i.e. they have to be reported. One of the attributes to be reported would be the "event type".

Should the European Parliament and the Council agree with this approach, the presence of event types would be ensured. This is important as there have been suggestions that the classification of the event types should be dropped and their analysis be replaced by text mining approaches. In regards to the work of developing and monitoring SPIs in ASCOS, dropping the reporting of event types would prevent any related analysis as well as the development of related SPIs and would thus prevent the process of performance monitoring from being implemented.



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The issue of multiple reporting of a given occurrence through multiple occurrence channels is known and is, at the time of writing this document, addressed by a working group of the ECCAIRS Steering Committee. It's report on progress is found on the ECCAIRS portal[22]. The technical issues appear to be well known, a political decision may be required to move forward.

In regard to the standardization of the reporting of event types (assuring that the same events are reported by different sources for similar occurrence scenarios), much work remains to be done. Experience working with data in the current ECR shows that some States consistently vary from the recommended approach to classification. For example, a "factor" should only be reported in ECCAIRS when it was relevant to the occurrence. The fact that a spoiler was not deployed should be reported only, when the deployment of the spoiler would have been required. Factors should not be used to simply record the position of flight controls in an operational occurrence. Other examples relate to some States not providing the complete story in the sequence of events by failing to report the last event (e.g. the collision with the ground after a loss of control or the go-around after an unstabilised approach).

Several mitigating measures could be considered: Data verification tools could be deployed to check the comprehensiveness and consistency of the reporting at the time of the initial entry of the data into the occurrence databases. Such tools have been developed by the EASA and are made available on the ECCAIRS portal. They should be further enhanced and their use should be promoted.

The ECCAIRS software already has the facility to develop and apply data quality rules.

In addition, samples of classifications for various occurrence scenarios should be prepared that clarify the required event type sequences for standard occurrence scenarios. Such work could build on the work done by EASA in developing coding guidelines for occurrence reporting.

3.2.3 Mapping exposure data to data in occurrence reports

In the development of rates, occurrences need to be mapped to related exposure data. For rates related to aircraft, the number of movements of a given aircraft type needs to be linked to the occurrences in which this type was involved. Development of such mapping has been complicated in the past because of the various ways in which aircraft types have been described.

For the Air Traffic Services, the aircraft is usually described via the ICAO type designator [3]. In aircraft registers aircraft are frequently identified using the CAST-ICAO Common Taxonomy Team taxonomy [8]. This approach has also been followed in ECCAIRS.

The aircraft type designator is provided for each aircraft in the CAST-ICAO reference database, but there are type designators for which CAST-ICAO does not (yet) have a related record and there are many entries in the CAST-ICAO reference database which share the same type designator. Thus, based on type designators, it is not always possible to obtain from an air traffic related flight database the number of flights for a given aircraft make model series.



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It should be noted that recent developments of type designators and developments of the CAST-ICAO reference database have been coordinated. Thus, while the problem of obtaining the matching exposure data exists for aircraft presently in service, it may be reduced or eliminated for new aircraft entering service.

3.2.4 Process considerations

In the above it has been demonstrated that the data required to develop the proposed SPIs are available and that, notwithstanding certain issues, such SPIs can be developed. The actual development of related tools is subject of work package D2.4 and will not be addressed here.

While thus the data issues have been addressed, the issues of which entity will be entrusted with the development and maintenance of the indicators, for which products the indicators will be built, what information will be fed back to the industry and what actions will be taken based on the indicators have not been addressed. These issues remain to be resolved.

In this context, one should consider whether indicators should be built to monitor the aviation system in Europe as a whole or whether indicators would be built that monitor those elements of the aviation system affected by ASCOS separately from those based on legacy methods. In any event, given the slow introduction of changes in the aviation system, the effects of ASCOS will not be seen for some time with any confidence in the data as a large number of occurrence reports will be required to obtain some statistical confidence.

3.3 The use of data from the Flight Data Monitoring (FDM), Flight Operations Quality Assurance (FOQA) in continuous safety monitoring

3.3.1 Background

At present airline operators collect large volumes of operational data that are recorded on the aircraft's quick access recorders. On modern aircraft thousands of variables are recorded as function of time. Such data are routinely analysed using a so-called Flight Data Monitoring (FDM) programme. FDM programmes assist an airline operator to assess their operational risks. This section is about the possibilities on how flight data obtained by FDM can be used to enhance the safety benefits of continuous monitoring approach in aviation. Ways for collecting and analysing FDM data are explored and possible methods for integrating the data with other data sources like occurrence reports are described. The analysis should also find answers to the following questions: How can normal operational data be used to monitor (trends) flight operations and flight crew behaviour?; and how can this information can be compared with expected operational and behavioural performance? Legal and organisational issues associated with the collection and use of flight data and other data sources are not considered in this section. The focus is on the technical possibilities and issues.



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3.3.2 The Use of FDM today

Airline operators make use of commercially available FDM programme software to analyse and monitor flight data from normal operations. The FDM analysis typically comprises of two elements: analysis of event exceedances and analysis of routine events. Event exceedance analysis is the classical way of looking at flight data. It looks for deviations from defined limits, standard operating procedures and good airmanship. An example is a deviation from a target approach speed. Routine event analysis does not look at deviations. Instead it looks at the distribution of parameters recorded for each flight. An example is the recording and analysis of deviations from the target approach speed of each flight as shown in Figure 3.

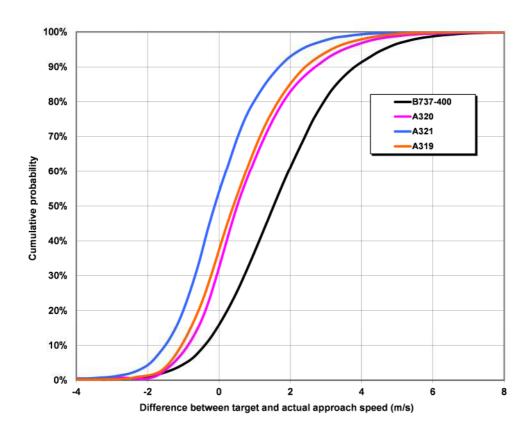


Figure 3 Example of routine event data (source: NLR)

Historically some regulators have been using flight data to support a range of airworthiness tasks. Examples are the recording and analysis of in-flight turbulence (gust loads), landing impact loads, characteristics of autopilot nuisance disconnects, autopilot-aircraft coupled oscillatory behaviour, manoeuvring acceleration profiles, encountered weather conditions etc. Most of these efforts were limited to a small group of operators or aircraft types. Airline operators also can use flight data for their own continued airworthiness purposes like autoland performance, engine thrust levels, system performance monitoring, flying control performance, brake and landing gear usage. Use of flight data for continued airworthiness is therefore not entirely new. However, the use of flight data at an European aggregation level has not been explored yet as well as



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integrating it with other data sources like occurrence reports. Such an initiative is attempted in the United States with the FAA Aviation Safety Information Analysis and Sharing (ASIAS) System. The ASIAS system is an initiative by the government and industry to share and analyse safety data proactively and timely to identify safety issues and mitigation measures. It enables users to perform integrated queries across multiple databases, search an extensive warehouse of safety data, and display pertinent elements in an array of useful formats. Flight data are part of the data that are collected (called FOQA data in the US). A large number of US operators provide their flight data to the ASIAS system and as of mid-2012 44 airlines provide data from their voluntary occurrence reporting programs to the ASIAS system. The airline safety data are being safeguarded by The MITRE Corporation which also performance the data processing and analyses. The ASIAS system is currently not used for continued airworthiness purposes. Some examples of data analysis challenges of ASIAS are described in ref. [47]

3.3.3 Setting up a flight data database at a European aggregation level

There are basically two approaches of setting up flight data database at a European aggregation level. In the first approach operators provide predefined parameters or events from their FDM programme to the central database. In the second approach the operators simply provide all their raw flight data recordings (time traces) to the database. Both approaches are discussed in more detail.

3.3.4 Central collection of predefined FDM parameters/events

The first approach is the easiest one for the entity that collects stores and analyses the data. Values of the parameters are simply stored into a database including some background data like type of aircraft and date. This process is illustrated in Figure 4. Event exceedances can be collected in this way. Routine events can also be collected in this way. However, this will give a continuous flow of data from the airline operators to the entity as the parameters are recorded for each flight. Difficulties arise in this approach from the wide variation of parameter definitions that are being used by the operators. It is known that there are often no common definitions used for the many parameters that are collected through FDM. This is especially true for event exceedances. For instance the thresholds used to detect an exceedance can vary amongst the different operators. The pre-defined criteria for event exceedances typically exist of two components: predetermined thresholds of the parameter and the duration of exceedance of the parameter to trigger an event. These criteria are determined by reference to the various operational manuals and are often tailored to the individual requirements of the operator. This means in practice that different criteria can be used by the operators for monitoring the same event. For example an operator defines the flap placard speed exceedance as any speed that is higher than the flight manual placard speed for at least two seconds. Another operator has defined the flap placard speed exceedance as any speed that is 5 knots higher than the flight manual placard speed for at least three seconds. Although both operators look at the same event, they do not get the same results in terms frequency of occurrence of flap placard speed exceedances. Another example is for unstabilised approaches which are monitored by most operators. There are many different ways for defining an unstabilised approach. Although the standard operating procedures provided by operators to their flight crews are often very similar (even for different aircraft types), the way unstabilised approaches are identified



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from the flight data is not. Different criteria and definitions are applied by operators to monitor unstabilised approaches. Also the various FDM software tools used by the operators can have use different internal definitions for the parameters they produce from the flight data. Controlling these issues have proven to be very difficult as operators are often reluctant to change their own in-house definitions, simply do not have the resources to build custom queries to extract common defined parameters, and/or are limited by the FDM software tools they use. Another major drawback of the first approach is that it is very inflexible when new safety issues emerge. One can only analyse those parameters that have been pre-defined and recorded. If new parameters need to be analysed, these have to be collected again from the operators. This collection process can take up significant time as historical flight data are often not available from the operators.

3.3.5 Central collection of raw flight data

In the second approach, the airlines provide raw flight data to a central database where the data is further processes and analysed by an entity to determine the aggregate FDM parameters/events. The second approach lacks the important drawbacks of the first approach. As raw data are collected in this approach, the entity that collects and analyses the data can use its own definitions and criteria for the parameters. These definitions and criteria apply automatically to all operators that provided raw time traces. Also the possibility to look for new parameters is much easier and faster in the second approach as historical records are kept of the raw flight data. The second approach is illustrated in Figure 5. Note that the second approach of raw flight data collection is also used in the FAA ASIAS system. A major drawback to the second approach is that all the collected raw flight data need to be stored, processed and analysed using special software tools. Also expert knowledge in flight data analysis and flight operations is required within the staff of the entity that is responsible for this process. The format in which the raw flight data are provided can also complicate the data processing. If raw data are provided in binary format (zeroes and ones) the conversion into meaningful engineering units (feet, knots) is done using a data map, a sort of conversion table. This data map is required for every airline's aircraft fleet as it is dependent on the on-board avionics systems and their set-up. The airline will have the data map as part of their FDM programme and this should be submitted to the collecting entity together with the raw flight data. If the airline operators submit processed data, or time traces of engineering units, they will do the processing of the raw data and the data map is not an issue. This all requires significant resources to manage (mainly cost of the software and man-hours) which will be much higher than for the first approach.

In both approaches de-identification of the flight data will be needed. Identification of flight crews should not be possible. However, identification of aircraft types is essential for using the flight data for continued airworthiness purposes.



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Approach one

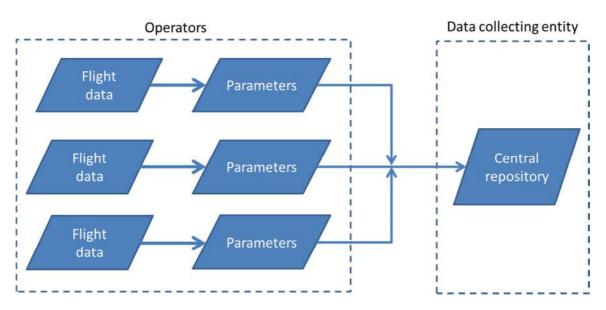


Figure 4 Illustration of approach one for flight data collection

Approach two

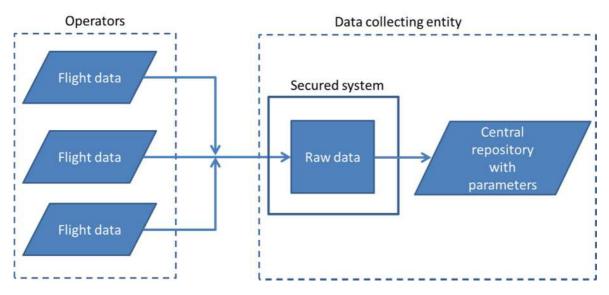


Figure 5 Illustration of approach two for flight data collection

3.3.6 Exposure data

When using the first approach for collecting flight data events /parameters, care should be taken to also collect corresponding exposure data like the number of flights and flight hours in order to be able to normalise



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the data. In the second approach raw flight data are collected which allows determination of the number of flights and flight hours. When collecting occurrence reports from airlines the collection of corresponding exposure data is essential as well.

3.3.7 Use of flight data for continuous safety monitoring

During certification many assumptions are made about the operational conditions, crew behaviour (e.g. response times), and system performance. Flight data provides an excellent source for monitoring (trends) in flight operations, system performance and flight crew behaviour which provides feedback on the assumptions made in certification and helps to identify new/changed hazards and assess associated risks. In most cases events can be defined in the FDM software to monitor flight data in areas that are directly related to for instance operational conditions, crew behaviour and system performance. The data for the events can be compared with the operational, system and behavioural performance as assumed during certification. Both event exceedances and routine events can be used for this purpose. Examples of event exceedances that can be monitored are stick shaker activation, high normal loads, Maximum Operating Mach Number Mmo, and low buffet margin events. Routine event examples are pilot reactions times to e.g. Terrain Awareness and Warning System TAWS alerts, aircraft system performance like erroneous radio altimeter signals or unreliable indicated airspeeds, and flight crew procedures non-compliance like engaging autopilot or autothrottle systems during approach and landing in the event of a radio altimeter malfunction.

In Figure 6 an example of the frequency distribution of the pilot reaction time to a TAWS alert is shown (based on more than 18 million flights). The distribution of response times shown can be compared to an assumed minimum pilot response time as defined in for instance EUROPEAN TECHNICAL STANDARD ORDERS ETSO-C151b for Terrain Awareness and Warning Systems.

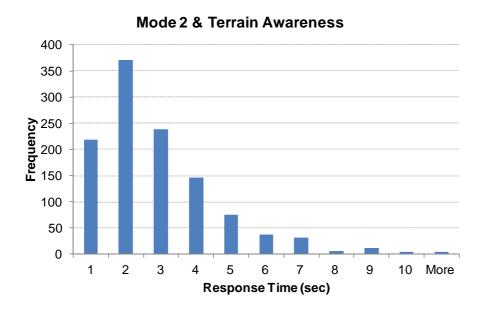


Figure 6 Example pilot reaction time distribution to TAWS alert (source: Honeywell)



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Another example of flight data analysis in support of continuous safety monitoring is the data-mining exercise performed by the UK AAIB in the aftermath of the Boeing 777 fuel-icing related accident at Heathrow on 17 January 2008. Flight data from more than half a million flights were analysed during the investigation for various variables like fuel temperature in flight and engine fuel flow on long-duration B777 flights with the aim to detect any parameters or a combination of parameters that were unique to the accident flight.

When using the first approach for collecting flight data events, care should be taken to also collect corresponding exposure data like the number of flights and flight hours in order to be able to normalise the data. In the second approach raw flight data are collected which allows determination of the number of flights and flight hours.

3.3.8 Integration of flight data with other data sources

Benefits can be obtained when the recorded flight data events are linked with other data sources. Integration with other available data for improved contextual picture and in some cases it is essential for the analysis. For instance TAWS events could have occurred in day VMC conditions in which pilots do not always have to respond to the alerts per the Standard Operating Procedures. The general weather conditions are not recorded in the flight data and therefore it is recommended to link the data with archived weather reports. Linking flight data with other data sources like weather is already done by some operators.

Flight data events can also be linked with occurrence reports like air safety and maintenance reports. This is often done by individual operators. The advantage is that the reports by personnel will provide context to the exceedance/event detected in the FDM programme. From the FDM programme you may learn "what happened, and when", but not "why". The latter is relevant in the safety analysis and for mitigation. It should be realised that it is possible that no safety report has been submitted for an apparently reportable incident which is however detected by the FDM programme. Events that are not subject to mandatory occurrence reporting would normally not be reported by flight crews. In other cases the flight crew simply could have believed that the occurrence was only of low significance and no formal report was submitted by the crew. On the other hand, the crew may decide to submit a report as part of the airline's (voluntary) reporting program. These problems arise when trying to link an individual safety report to the corresponding flight data. For continuous safety monitoring it could be more interesting to validated trends found in e.g. occurrence data with flight data and vice versa. This however requires that the definitions used for an occurrence are the same as for the flight data events.

If the entity also collects occurrence data from the airline operators a few issues need to be taken into consideration. First, there is no standard for reporting forms, so records from (voluntary) reporting programs will differ across the airline industry. The level of detail, completeness and quality of the reports will vary, even within a single airline. Taxonomies used to classify occurrences and the risk levels of occurrences vary by airlines as well.



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Secondly, the information in the records and narratives may contain very relevant safety information, but it takes a significant effort to analyse large sets of occurrence reports. The safety analyst has to go through the records individually to assess the information contained in the reports. It takes time and manpower to be able to select the reports relevant to the analysis at hand, and to make an assessment of the relation of the reports to FDM parameters/events. There is no substitute yet for "manual" review of records. Automatic techniques, like text—mining have not yet reached a maturity level to do the analysis and processing effectively and correctly.

De-identification of data is necessary, but as a drawback useful information may be lost for the analysis.

Some airlines are starting to employ techniques like bow-tie models to structure the integration of different data sources. The models are used for representation of the relation between hazards, safety barriers and undesired outcomes. They contain events which can be quantified or associated with FDM parameters (e.g. hard landing, unstable approach) and occurrence reports from voluntary reporting programs. This way the models provide a "hook" for data from FDM and occurrence reports to help the analyst to monitor and assess the quality of the safety barriers for example.

The entity that collects flight data and data from other sources may need to develop similar models as well to enable the integration of data from different sources to be able "to connect the dots" and to analyse the safety information from FDM and occurrence data for continued airworthiness purposes.

3.3.9 Integration of flight data with ECCAIRS

The ECCAIRS is not suited to do any kind of flight data processing nor can be used for the identification of event exceedances and routine events. Changing the ECCAIRS software to be able to do this is also not feasible. Specialised FDM software is needed for that purpose. However the event exceedances and routine events data obtained from the flight data can be stored into the ECCAIRS system together with the corresponding background data like aircraft type, weather etc. without major changes to the ECCAIRS software.

3.3.10 Final remarks

Flight data provide an excellent source to enhance the safety benefits of continuous monitoring approach in aviation. It is feasible to use flight data to monitor (trends) flight operations and flight crew behaviour and compare this information with expected operational and behavioural performance. The most flexible and effective approach is to collect raw time trace flight data, however this requires significant resources to manage.



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3.4 The Automatic Safety Data Gathering in ATM as a source for continuous safety monitoring

In analogy with FDM, the Automatic Safety Data Gathering (ASDG) may be defined as the process of using an automated system to detect occurrences that may be related to the safety performance of the ATM system, to collect and record relevant context data, and to assist with the interpretation of the occurrence data [36]. Since the late nineties, this process has been encouraged by EUROCONTROL with the design of the Automatic Safety Monitoring Tool (ASMT), a tool that supports the monitoring of safety performances at the level of the overall ATM Safety. The information obtained with this tool can help the Air Navigation Service Providers (ANSPs) to define improvement actions in the following domains:

- SMS efficiency
- Airspace / airways structure design & sector configuration
- Local procedures review
- Operational analysis of the impact of traffic distribution / Sector charge on safety
- Regulation / flow management
- Alert equipment and operational techniques

Originally developed in 1996 at the EUROCONTROL Experimental Centre, the ASMT has the capability to collect and analyse track data and flight plans in quasi-real time. Two different types of events trigger the ASMT recordings:

- Internal Events, i.e. events directly collected by the ASMT internal logic
- External Events, based on alerts received by ground and airborne safety nets.

The first category includes the following events.

- **Proximities**: infringements of separation minima between aircraft
- Altitude Deviations: detections of aircraft that do not comply with the cleared flight level (e.g. Level Bust)
- Airspace Penetrations: detection of unauthorised penetrations of a segregated airspace
- Rate of Closure: infringements of vertical and horizontal distances occurring with a 'rate of closure' exceeding a specified value.

While the second category includes the following events.

- Short Term Conflict Alerts: predicted infringements of separation minima, triggered by the reception of an STCA message series from the ATC system
- Area Proximity Warning: predicted infringements of a segregated airspace
- Airborne Collision Avoidance System Resolution Advisory: Traffic Collision Avoidance System (TCAS)
 resolution advisory following the detection of a threat from another aircraft (triggered by the
 reception, through the Mode-S downlink data, of an ACAS Resolution Advisory message generated by
 an aircraft Traffic).



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For each detected occurrence, ASMT stores the relevant data (shortly before, during and shortly after the event) into a database that can be later queried to extract the data or to review the occurrence in a dedicated replay window. The recording of all these events correspond to different ASMT software modules, which can be configured independently at local level, focusing the priority on one or the other aspect, depending on the safety policies and SMS of the specific ANSP.

While most of the ANSPs are still relying on manual reporting, there are advantages of using a tool like ASMT. First of all the automatic monitoring can help to spot the occurrences that are not collected with the manual monitoring and to focus the attention also on minor safety occurrences with an operational relevance. Such occurrences may actually help to have a more accurate overview of the current level of safety (e.g. minor separation minima infringements or altitude deviations with no safety consequences). Secondly, the availability of a large amount of data opens new opportunities for a statistical characterization of the data set under analysis. In this case, compared to current investigation processes, the attention focus shifts from the causes and dynamics of single events to emerging statistical characteristics [49]. Examples of these statistical characteristics could be:

- **Identification of patterns** and **hotspots** (e.g. the areas with a higher concentration of a certain safety occurrence. Refer to Figure 7);
- **Trend analysis** (e.g. the daily, weekly or seasonal variations of the amount of a certain safety occurrence);
- **Correlation Analysis** (e.g. the link between the Flight Level at which the aircraft is flying and the *risk of collision* associated to a loss of separation occurrence).

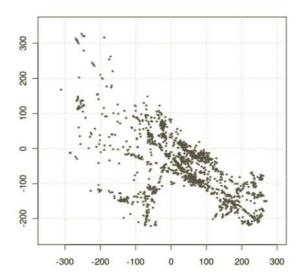


Figure 7 Example of STCA events plotted on an X-Y map to identify STCA hot spots (source: Pozzi et al. 2011)

The current major limitation of ASMT is certainly the sensitivity of the data being collected, especially as far as legal recording and human reporting are concerned. ASMT can be easily considered as a "big brother" tool, spying over the controller's shoulder and supporting a blame culture of punishment. Therefore, before starting



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implementing ASMT in an organization, clear safety policies should be established to favour its acceptability, by clarifying the scope of the associated safety monitoring and by providing the necessary assurance that the tool is intended to improve safety at a system level and not to punish individual operators. After its initial introduction and testing in 1996 and after the following software developments since 2004 (when the ASMT project started to be managed by the EUROCONTROL HQ), such difficulties have partially slowed down the adoption of the tool around Europe. Nonetheless the ASMT is now installed in 6 European ANSPs and other ASDG tools with a similar purpose and logic were developed and installed independently in other 4 European ANSPs. [38]

3.4.1 Potential use of ASDG in the ASCOS Safety Performance Monitoring

Duly integrated with FDM and the voluntary reporting of the aviation system operators, the ASDG in ATM may offer an excellent opportunity to feed the Safety Monitoring Process envisaged by ASCOS. Despite the number of European ANSPs with an ASDG tools being installed is still limited and characterized by a heterogeneous configuration and use of the tool itself, the possibility to have automatically generated data of a significant part of relevant safety occurrences appears very promising. Major obstacles are of course the legal implications of the provision of safety data under the authority of each EU State and the lack of standardization in the definition of each safety occurrence. Nonetheless the Commission Implementing Regulation (EU) N. 390/2013 aimed at defining Key Performance Indicators (KPIs) for four Key Performance Areas (KPAs), including Safety, could be considered a first step to overcome these limitations [14]. As a matter of fact, such Implementing Regulation introduces the Risk Analysis Tool originally proposed by EUROCONTROL [39] as a mean to classify three categories of occurrences at the European Union Level: Separation Minima Infringements, Runway Incursions and ATM-specific Occurrences. Furthermore it includes, among others, the performance indicators "The application by the air navigation service providers of automated safety data recording systems where available, which shall include, as a minimum monitoring of separation minima infringements and runway incursions".

To further encourage this process, the approach which is here proposed is to distinguish the automatically generated data that should be retained at local level for the purposes of local safety policies, from the data that might be shared at European level in order to contribute to the Safety Monitoring Process of the Total Aviation System. If we refer for example to the wide range of recording modules of ASMT, it is clear that not all of them would produce information easily comparable at European level.

Data such as those triggered by the ground Safety Nets (e.g. the STCA and APW) might be very useful for improvement processes at local level. As documented in some recent case studies [50], when correlated with other ASMT data, they could help to validate the "fit-for-purposeness" of the STCA in a specific operational environment or to spot configuration issues of the Multi Radar Tracking system (MRT) in systematic manner. On the other hand they will have a limited comparability at a global level, especially since the safety nets and the MRT are generally implemented in a different way and with different configurations depending on the specific ANSP and Area Control Centre.



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Data such as the Infringements of Separation Minima or the Levels Busts – which have been indicated among the ASCOS SPIs - will be easily comparable, especially if they are classified with a common scheme such as the EUROCONTROL Risk Analysis Tool (RAT) [39]. As suggested in [43] this severity criterion may also be used to distinguish inside a specific occurrence category the vents to be shared at global level, from those that can be retained at local level for the ANSP's own safety policy applications.

For example, concerning the Infringements of Separation Minima, the RAT method calculates the risk of collision (ROC) as a combination of two different scores in a dedicated marksheet (refer to Figure 8): a score indicating the minimum separation achieved between two aircraft and a score indicating the rate of closure between the two aircraft.

1. Risk of collision	ATM ground	ATM airborne	ATM overal
Minimum separation achieved	0	0	
Separation + 75% minimum	1	1	
Separation >50%, <=75% minimum	3	3	
Separation >25%, <=50% minimum	7	7	
Separation <=25% minimum	10	10	2
Total separation (a)			
Rate of closure NONE	0	0	
Rate of closure LOW (<=85knots, <=1000ft/mn)	1	1	
Rate of closure MEDIUM (>85 and <=205 knots, >1000 and <=2000 ft/mn)	2	2	
Rate of closure HIGH (>205 and <=700 knots, >2000 and <=4000 ft/mn)	4	4	
Rate of closure VERY HIGH (>700knots, >4000ft/mn)	5	5	
Total rate of closure (b)			

Figure 8 Example of Severity Marksheet from the Risk Analysis Tool (EUROCONTROL 2009)

In this case it is proposed to select only the Infringement of Separation Minima with a ROC higher than 7. In the 'separation' part of the marksheet a score of 7 corresponds to a separation included between the 25% and the 50% of the applicable separation minima. With such a severe loss of separation, even the combination with a rate of closure of 1 (corresponding to a low rate of closure, included between 60 kts and 1000 ft per minute) would produce a ROC of 7 and lead to the inclusion of this occurrence among those to be monitored at global level. On the other hand, the same rate of closure will produce a ROC lower than 7, if combined with a less severe infringement of Separation Minima (e.g. more than the 75% of applicable separation minima) and would be considered only as a safety occurrence to be investigated at local level, after a qualitative consideration of its actual dangerousness.



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3.5 Flight simulator data as input for continuous safety monitoring

The simulators provide a controlled environment for analysing influences on human performance. Studies involving flight simulators and air traffic control simulators are particularly relevant for pilot performance and air traffic controller performance.

US report on The Aviation System Monitoring and Modeling discovered the following aspects of proactive management of safety risk can be met only with simulation [57]:

- Determination of human and machine requirements for successful task performance (perceptual, cognitive, motor, and informational);
- Description of possible mechanisms for that performance;
- Definition of causal relationships between the human operators and the context, in which they
 operate;
- Prediction of performance of human-system model involving multiple interacting humans and machines under nominal operating environments;
- Identification of hazards and their causal factors in new operating environments for which there are no data or experience;
- Determination of risks of identified and unexpected hazards.

The following examples of simulation data analysis are mentioned in the research papers [56]:

- the balked landing and missed approach manoeuvres providing data for pilot control behaviour for different aircraft configurations and weather conditions (NASA Ames);
- human in the loop simulations to understand the factors that contribute to taxiway navigation errors (NASA Ames);
- human in the loop simulations with air traffic controllers and included measurements of controller workload (NASA Ames, NLR).

At organisational level, however, there are no facilities to study simulation data. Only expert judgment is available at this level. [56]

Assuming the human factor data generated during professional programs of simulated flights are as valid as real-flight data, the ASCOS SPIs of Human level automatically detected among this data may serve as safety performance evaluation of the diagnosed personnel (refer to Figure 9)



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EASp Operational Issue	Safety Occurrence	Possible associated human errors	Impacted Accident Scenario Event	Possible automatic detection tool
Ground	Runway Incursion	Erroneous departure clearance or taxi clearance issued by ATCO Departure or taxi clearance erroneously executed by FC Call-sign confusion Incorrect phraseology Incorrect pilot readback	ASC32a1	RIMCAS log files
Collision	Taxiway Incursion	Erroneous taxi clearance issued by ATCO Taxi clearance erroneously executed by FC Call-sign confusion Incorrect phraseology Incorrect pilot readback	ASC36a1	Currently not available
	Stall Warning	Pilot inability to manage low level wind shear or high level Clear Air Turbulence. Attempted flight with total load or load distribution outside of safe limits.	ASC38a1	Stall Warning System log files EGPWS or TAWS Stall Warning log files
Loss of Control in Flight	Bank Angle alert	Lack of situational awareness by FC concerning excessive bank angle FC temporarily unaware that aircraft that the Autopilot is disengaged and failing to scan Flight Navigation Display while undertaking other duties Pilot inability to manage low level wind shear or high level Clear Air Turbulence.	ASC38a1	Flight Data Monitoring (FDM) E-GPWS or TAWS Bank Angle alert (Mode 6) log files
Controlled Flight Into	Near CFIT	Altitude component of clearance/avoiding action erroneously executed by FC	ASC35a1 ASC35a11 ASC35a12	MSAW log files TAWS or EGPWS Excessive Closure

Figure 9 Human level SPIs (source: ASCOS D2.1, p.48,

3.6 Protection of safety data

Information provided by aviation personnel is essential for safe operation of a complex and vulnerable air transport system. Potentially fatal accidents and incidents in the transport system operation can be prevented only when the underlying or contributing safety issues are known in time. Often the only source of an early warning of a safety issue or a deficiency is the personnel.

People are, most often, willing to share their knowledge if their personal safety and privacy is assured, that is their identities will remain protected and there are neither disciplinary nor legal consequences for reporting. In this safety-oriented approach, it is important to learn and fix mistakes rather than pursue possible offenders. Consequently, a properly constructed reporting system is confidential, voluntary, non-punitive, independent and can be used by any person to safely share information. Closed reporting systems have known weaknesses, as legal and financial responsibility may disrupt investigation, even if limited protection of reporters exists. But most importantly, unless incident data is shared with other systems, the safety information gathered by the closed system is lost to users throughout the industry [1].



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Given the potential for misuse of safety data that have been compiled strictly for the purpose of advancing aviation safety, database management must include protection of the data. Protection considerations include:

a) Adequacy of protection — access to information. Regulations vis-à-vis safety management requirements.

The only purpose of protecting safety information from inappropriate use is to ensure its continued flow from the aviation community, so that adequate preventive actions can be taken in time to improve aviation safety. Protection of safety information should not interfere with the proper administration of justice. National laws and regulations protecting safety information require a balance between the need of protection of safety information for improvement of aviation safety, and the need for proper administration of justice. Protection of qualified safety information, including provision of appropriate national regulations, is part of each state responsibilities. The protection measures, including necessary formal procedures, are suited specifically for each SDCPS, depending on the safety information stored [1].

b) Policies limiting information flows (need to know only).

Considering the sensitivity, in some states, regarding the dissemination of incident information, only accredited representatives and their advisers provide the state conducting the investigation with all relevant information available to them and may not divulge information on the progress and the findings of the investigation without the express consent of the State conducting the investigation.

The Authority will not disclose the name of the person submitting the report or of a person to whom it relates unless required to do so by law or unless, the person concerned authorizes such disclosure.

c) De-identification.

As the only purpose of incident information collection is the improvement of safety, including accident prevention, all reports need to be de-identified. De-identification is carried out by removing all the information enabling to track the original reporters: names of persons, places, registration numbers, etc.

After the reports are read, accepted and de-identified, or rejected the original problems reports need to be destructed to prevent their improper use.

d) Security of information systems.

The requirements for security of information systems are stipulated by national regulations in each country. Regulations protecting the right for privacy stipulate the need to protect personal data and levels of protection. The subject of protection is also sensitive data of organisations. Security requirements are also included in regulations regarding electronic commerce (which include data storage) and electronic data protection.



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The aim of regulations is to secure confidentiality of data, prevention of unauthorized access, use, disclosure, disruption, destruction, modification, perusal, inspection, recording and to secure that the data processing standards are met.

The standards play a key role in evaluation of security level of information. These include standards published by ISO, IEC, TIA or ANSI (e.g. TIA/EIA 942A, EN 1047-2:2009, EN 50173-5, ISO/IEC 11801 2002, ISO/IEC 24764, ANSI/BICSI 002-2011, EN50600, ISO/IEC 27001:2013, BS 7799-2, ISO/IEC 27002:2005).

Security of the information systems is addressed in the security policy implemented in the organisation managing databases. The policy defines which data needs what defined level of protection and what authorisation is granted to which users. Security policy is enforced by the security mechanisms that include software protection in operational systems, databases, as well as physical protection. In databases, the control means include discretionary and mandatory access control, statistical databases are accessed by sum-queries and operations audits are performed. Other means of protection include RIAD matrices (also backup), data encryption, firewalls, digital certificates and encrypted connection (SSL).

e) Prohibitions on unauthorized use of data.

The analyses for the purpose of safety improvement can be carried out only based on aircraft incident information, without the need for identifying it as such. Therefore, before publication of the results all the data need to be de-identified. Names of persons, owners, operators, states of registry and registry/serial numbers may not appear in the public reports. Formal criteria are required for disclosure of any information, they may include the need to correct hazards to safety, improve policies or regulations. Any person or organisation willing to disclose the information should justify the release of information. The disclosure of any information must be done in a de-identified form to protect privacy and respect appropriate regulations and not inhibit further information flow from the aviation community [1].

3.7 Conclusions and recommendations on the safety data management

The quality and quantity of data collected is a fundamental requirement for safety data to be used effectively for continuous safety monitoring. The flow of safety data from operator level to regulatory authorities must become an integral part of safety management requirements and become established as such in the governing legislation.

To address data quality issues, requirements can be gradually introduced to establish a common taxonomy, data format, etc. at operator level. This will influence the manner data is collected and create greater standardisation with regards to taxonomy and compatibility of commercially available safety reporting/management software with that used by the central repository. This can become part of the framework for future safety reporting schemes and ensure seamless reporting across all stakeholders directly into the central database.



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The same applies to the potential use of FDM in airlines and ASDG in ATM for continuous safety monitoring at a regulatory level. Achieving this will mean breaking away from many of the constraints which limit effective data sharing among the stakeholders of the aviation community. Data protection laws require that flight data is used in a de-identified manner whilst still generating safety benefit of using the data in aggregate format.

Flight data provide an excellent source to enhance the safety benefits of continuous monitoring approach in aviation. It is feasible to use flight data to monitor (trends) flight operations and flight crew behaviour and compare this information with expected operational and behavioural performance. The most flexible and effective approach is to collect raw time trace flight data. This will generate greater benefit and flexibility from a safety management perspective than a process which relies on reporting pre-defined safety parameters and events. The downside is that the collecting, processing and analysis of raw time traces requires significant resources.

Some flight data standardisation initiatives are beginning to emerge among European operators and the regulatory authorities, industry and EASA. The EASA led European Operators Flight Data Monitoring (EOFDM) forum and the UK CAA's FDM forum are two such initiatives which are not only enabling operators to implement FDM and get the most benefit out of such a system but are looking at novel ways of combining collective experience and limited de-identified datasets to better identify safety hazards through FDM.

Although there is still a long way to go until raw flight data is collected on a systematic basis, such European initiatives bring together key stakeholders and are a step in the right direction which may pave the way for future use of flight data for continuous safety monitoring.

The best way to get benefit from the opportunities offered by the ASDG in ATM seems the distinction between a specific set of safety occurrences to be shared at global level to feed the continuous safety monitoring and another set of data to be retained at local level in support of local safety policies. In the latter case data may be shared with the Regulatory authorities only in the usual form of a manual reporting, after appropriate qualitative investigation has taken place by the service provider. The criteria proposed to distinguish the two sets of data is the identification of the ATM safety occurrences selected among the ASCOS SPIs and the adoption of the EUROCONTROL RAT tool as a way to isolate the most severe occurrences.



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4 Safety performance monitoring process for system of organisations

The list of ASCOS SPIs includes a level for System of organisation indicators elaborated for the aggregate performance monitoring. In fact any other ASCOS SPIs could be aggregated to this level, however only System of organisation SPIs count hazards that originate from the interfaces between different organisations.[43]

The idea of ASCOS is to include the events of System of organisation SPIs within the existing occurrence reporting and within State Safety Programmes of the EASA Member States. It is assumed, that the collection of these SPIs, the same as any other ASCOS SPIs, would be done by the ECCAIRS database.

The same philosophy of the management of change (PDCA) described for Safety Assurance at a service provider level (concerning Technology, Human and Organisation SPIs) would apply to the use of System of organisation level SPIs. (refer to 2.1.3)

The main difference would concern the leading SPIs and the precursors that were linked to these SPIs (refer to Appendix D, SPIs 47-63). Apart from other qualities (e.g. their normalisation would be determined case by case), the leading SPIs are positioned in different location in the chain of events. The precursors linked to these SPIs are no longer "precursors", but the results. They are the effects of the events measured by the leading SPIs. The nomenclature, however, was not changed due to the metaprocess structure (refer to 2.2).

The SPIs no. 47-63, however, are the SPIs that go beyond the required extension to the EU regulations on the occurrence reporting [56] and were not recommended by the Section 6.4.1 of ASCOS D2.1 due to non-conformity to 6 criteria [43].

4.1 Atypicality scores for SPIs aggregates at System of organisations level

One of the descriptive statistics allowing identifying underperforming organisation is a function of the Mahalanobis distance. It measures a unitless distance from a common point (multivariate data centroid) taking into account the correlations of data set. The distance is calculated by the following matrix algebra formula:

$$D_M(X) = \sqrt{(X - \mu)' S^{-1}(X - \mu)}$$

Where:

X – n x k matrix of n SPIs aggregated per period in organisation k

 μ – n x 1 vector of e.g. means for SPIs

 $S - n \times n$ covariance matrix of the $(X - \mu)$ matrix

The atypicality distance values are found in the resulting $D_M(X)$ (diagonals of k x k matrix). Organisations with the highest atypicality distance (e.g. top 5%) are underperforming in terms of safety assurance and should be considered for further, detailed examination.



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5 Conclusions and recommendations

5.1 Conclusions

- ASCOS method is aligned to the long-term ICAO Global Aviation Safety Plan (GASP) [7] to have appropriate performance indicators, to verify the causal factors and use the alert levels. The method supports the EASA recommended Management System (MS) and transition from quality management to SMS;
- ASCOS performance based safety monitoring process corresponds to the Continuous Monitoring Approach (CMA) used as integral part of the stakeholders' life cycle processes for the purpose of the Safety Assurance SMS component. The safety level is continuously monitored and semi-continuously measured;
- ASCOS method offers Safety Performance Indicators (SPIs) linked to causal factors precursors. An
 elaborated metaprocess allows for method improvement. A large number of occurrence reports will
 be required to obtain statistical confidence. The method is more oriented on precursors mitigation
 approach instead of traditional accident and incidents mitigation approach. It enables the prevention,
 mitigation or elimination of phenomena (precursors) directly leading to high risk events. When the
 TLS of the SPIs is exceeded, the list of identified precursors support root cause analyse and
 implementation of adequate risk mitigation plans;
- ASCOS SPIs can be counted using ECCAIRS taxonomy based occurrence reporting system;
- Flight data provides an excellent source for monitoring in flight operations, system performance and flight crew behaviour. FDM provides feedback on the assumptions made in certification and helps to identify new/changed hazards and assess associated risks;
- Bow-tie models contain events which can be quantified or associated with FDM parameters and occurrence reports from voluntary reporting programs;
- ATM related ASCOS SPIs (such as separation infringements, level busts) are easily comparable
 especially if they are classified with a common scheme such as the EUROCONTROL Risk Analysis Tool
 (RAT).

5.2 Recommendations

- ASCOS suggests the use of ASCOS SPIs method by service providers in their SMS Safety Assurance, in
 the process for safety performance monitoring and management. Due to the high number of possible
 consequences of a typical precursor, it is necessary to quantify the linkage between occurrence
 probability and chance for a given precursor to have occurred. It can be achieved by focussing more
 on the identified precursors when developing occurrence scenarios;
- It is proposed that the SPIs are collected using the ECCAIRS database and aggregated at the service provider level, state level and EU level. Wherever applicable, it is recommended to stay aligned to the ADREP taxonomy. Inclusion of the best practices, already used by EU local CAAs, mentioned by EASp is advised;
- Some minor additions to the taxonomy could be suggested to the ECCAIRS Taxonomy Working Group;



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- Data verification tools would be needed;
- Samples of classifications for various occurrence scenarios should be prepared that clarify the required event type sequences for standard occurrence scenarios;
- Linking the collected data with archived weather reports would be needed (already done by some operators).

Two approaches to FDM as the source for the SPIs are recommended:

- 1. **Central collection of predefined FDM parameters/events** allowing a continuous flow of data from the airline operators to the entity with a need to collect corresponding exposure data to normalise the data
- 2. **Central collection of raw flight data** allowing easy data collection (already used e.g. in the US FAA ASIAS system), but requiring special software tools to store, process and analyse

No matter what approach is chosen for continued airworthiness purposes, it is recommended to address data quality issues, requirements including a common taxonomy and data format, etc. at operator level as well as the potential use of FDM in airlines and ASDG in ATM for continuous safety monitoring at a regulatory level including de-identification of the flight data, but identification of aircraft types.



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Appendix A The result: links between precursors and SPIs

Please refer to Appendix A.pdf for the full table of results (154 pages)

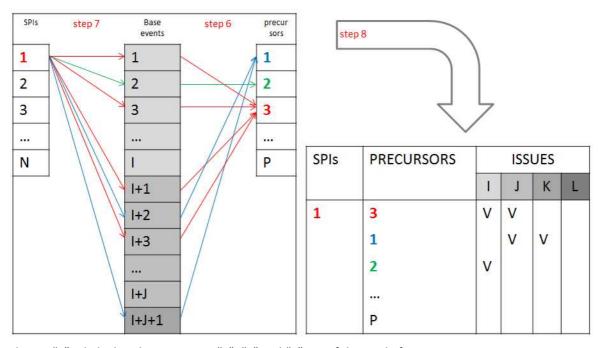
Brief explanation below, only.

The resulting set P_{SPI} of precursors corresponding to each of the SPIs was developed by a reduction of redundant information from the original Step 8 table. It was generated by the application of a conditional sum of sets on all precursors throughout all of the CATS for ASCOS v0.1 ESD Base Events. The condition was defined as a link to the same SPI of the same precursor. If this link was repeated several times the resulting set reports it only once.

$$P_{SPI} = \bigcup_{i \in Base\ Events} P_i \{p | SPI\}$$

where the set P_{SPI} is reported in Appednix A. pdf

and where any precursor $p \in P_i$



The SPI "1" is linked to the precursors "3", "1" and "2" out of the total of P precursors.



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An example. A quick scan of the Appendix B locates the same precursors at least 3 times for SPI1.

Appendix A, page 2, first line (example of the result of Step 8):

	TECHNOLO GY	Occurrences: Uneventful events	GCOL	LOC-I	CFIT	MAC	RE-TO	RE-L
1	Rate of autoflight system failures/flig ht	System failure affecting the operation of primary instruments / displays or standby instruments		٧		>	٧	

1) LOC-I (=ESD 5,6,8,11-21)

Appendix B, Step 8, page 429 (You find the source ESD code at this page.)

ESD 13 Code	Identifiable Precursors	No.	Technology	Human	Organisation	System of Organisations
and page 4	130 (You find the source precursor at this pag	e.)				



2) MAC (=ESD 31)

Appendix B, Step 8, page 532 (You find the source ESD code at this page.)



... and page 533 (You find the source precursor at this page.)

46 ER31833	Traffic controller tiredness - Inadequate workload distribution	137 (1) 3;	18; 19; 20; 21; 25	27; 31; 32; 33; 34; 35; 39;	47; 48; 50; 51; 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
	Flaws in traffic controller requirements definition process and/or training methodology	/ 145			
	System failure affecting the operation of primary instruments / displays or standby instruments	26			

3) RE-TO (=ESD 1-5, 9,10,)

Appendix B, Step 8, page 578 (You find the source ESD code and the precursors at this page.)

ESD1	Code	identifiable precursors	No.	Technology	Human	Organisation	System of Organisations
- 1		Aircraft System Failure					100
1	T001811	System failure affecting the operation of primary instruments / displays or standby instruments	26	1) 3; 9;	13; 18; 21; 22;	31; 41;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63



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Appendix B Details of Step 1 to 8

Please refer to Appendix B.pdf (623 pages)

Appendix C The precursors and stakeholders of CMA

Appendix C.1 Precursors – occurrences and their stakeholders

PRECURSORS			STAKEHOLDERS maintenance of certificates				
Occurrences (Uneventful Events)	No.	cont. airworthiness of aircraft	ANS	operators	manufacturers		
Runway confusion	1		V	V			
Fuel leak	2	V			V		
Engine stops during start or approach / landing	3	V			V		
Engine overheating	4	V			V		
Wildlife incursion	5		V				
Adverse weather / poor visibility conditions / darkness	6		V				
Taxiway confusion	7		V	V			
Emergency landing	8		V	V			
Taxiway incursion	9		V	V			
Stand confusion	10		V	V			
inadequate anti-ice fluid holdover Time (HOT)	11		V	•			
Contaminated wing	12		V	V			
Continued unstabilized approach (failure to comply with go-around criteria and policy)	13			V			
AOA prevents missed approach	14		V	V			
System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)	15	V	V	V	V		
Gross loading error	16			V			
Cargo loading unsecured / shift	17			V			
Convective weather encounter	18		V	V			
Extreme turbulence encounter	19		V	V			
Extreme icing conditions encounter	20		V	V			
Windshear encounter	21		V	٧			
Volcanic ash encounter	22		V	V			
Mountain wave / vortices encounter	23		V	٧			
Wake turbulence encounter	24		V	V			
System failure affecting aircraft configuration, controllability and/or flying qualities	25	V			V		
System failure affecting the operation of primary instruments / displays or standby instruments	26	V			V		
Failures resulting in a non-standard fuel distribution	27	V			V		
Uncommanded thrust asymmetry	28	V			V		



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In-flight smoke / fumes / fire (in cockpit, cabin, cargo) events that could affect the crew ability to conduct their duties and/or the aircraft controllability	29	V		V	V
Extreme icing condition and / or heavy snow. Break in airport operation due to adverse weather or / and necessity of RWY surface maintenance.	31		V	V	
Convective weather / turbulence / windshear or crosswind conditions during take-off	32		٧	V	
Cabin pressure drop as a result of aircraft structural failure	33	V			V
Bird strike	34	-	V	V	-
Turbulence encounter	35		V	V	
Convective weather - heavy rain / hail resulted with engine compressor failure	36	V	-	-	V
Inadequate fuel quality / type	37			V	
Crew is incapable in result of extreme turbulence	38		V	V	
Contaminated Runway	39		V	V	
			V	V	.,
Engine suffers severe surge	40	V			V
Severe failure of all engines on transoceanic route or over rarely populated area	41	V	V		V
Severe engine failure	42	V			V
Missed approach execution necessary after prolonged flight due to e. g. extreme weather	44		V		
Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate	45			V	
Cautions / warnings (genuine or spurious) that may lead to a low-speed or high-speed rejected take-off	46		V		
Hard landing	47			V	
Rejected takeoff (whether initiated below or above 100 kt) (+) due to an					
aircraft system failure including engine	48	V			V
Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown	49	V		V	
GPWS / TAWS alert / warning (genuine or spurious)	50	V			V
MSAW warning	51	V			V
Other cases of reduced terrain separation	52	•		V	•
Prolonged loss of communications (PLOC) between pilot and controller(s)	53		V	V	
Low-energy state during approach	54	V	V	V	V
Land short (runway undershoot) event	55	V	V	V	V
Low altitude pattern following a go-around	56		V	V	
<u> </u>	57		V	V	
Inappropriate low altitude maneuvering					
Low-on-fuel condition / fuel starvation	58 59			V V	
Crew incapacitation resulted from illness (e.g. food poisoning)					
Natural or artificial obstacle on runway course	60			V	
Error in preparation of database for FMS	61				V
Ground Navigational Aid failure	62		V		V
Landing gear retraction failure	63	V			V
Frontal surface encounter	64		V	V	
Convective weather / turbulence / windshear encounter conditions during landing	65		V	V	
Midair collision	66		V	V	
Collision with ground obstacle	67		V	V	
Inadequate NOTAM information concerning ground navigational aid failure	68		V	V	
Inadequate navigational chart	69		V	V	
TCAS RA events (genuine or spurious)	70	V			V
Airspace infringement	71	-	V	V	-
Other cases of loss of separation	72		V	V	



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Prolonged loss of communication (PLOC) between pilot and controller	73		V	V	
Failures affecting TCAS operation	74	V			V
Convective weather - heavy rain resulted with wet RWY surface	75			V	
Convective weather encounter in traffic intensive airport proximity	76		V		
Engine failure	77	V			V
System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System	78	V			V
Cabin pressure drop as a result of pneumatic system failure	79	V			V
Tire burst	80	V			V
Risk of dangerous occurences appeared during take-off roll	85		V	V	
Line-up events	93	V	V	V	V
Aircraft swerve / lateral excursion during takeoff roll	96			٧	
Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll	98	V			V
Runway incursion	99		V	V	
Crew is incapable in result of shock related to hard landing	103				
Tailwind or crosswind landing with tailwind and/or crosswind					
component(s) in excess of applicable limit(s), either intentionally or unknowingly	116		V	V	
Bounced landing	118			V	
Deep (long) landing	119			V	
Temporary loss of directional control during rollout	120			V	
Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWY.	123			V	
Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure)	124				٧
Lack of adherence to SOP for GND movements in terms of marshalling procedure	125			V	
Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication.	126			V	
Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	127			V	
Flaws in ground equipment maintenance process	128		V		
Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129			V	
Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130			V	



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Appendix C.2 Precursors – deviations and their stakeholders

PRECURSORS			STAKEHOLDERS maintenance of certificates			
Deviations (Procedural/Flight Path)	No.	cont. airworthiness of aircraft	ANS	operators	manufacturers	
Inadvertent deviation from cleared taxi route	131			V		
Lack of English proficiency	132			V		
Incorrect or confusing / misleading ATC instructions	133		V			
Use of non-standard phraseology by pilot and/or controller	134		V	V		
Lack of adherence to emergency procedures - RWY collision avoidance	135			V		
Flaws in aircraft system maintenance process definition - stickshaker	136	V				
Traffic controller tiredness - Inadequate workload distribution	137		V			
Lack of adherence to SOP for GND movements. Poor execution of parking / docking /pushback procedure	138			٧		
Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	139		V			
Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications	140			V		
Lack of adherence to SOP for GND movements.	141		V	V		
Lack of adherence to SOP for GND movements. Lack of awareness of	141		V	V		
own position on the airsite and airport topology.	142			V		
Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence	143			٧		
Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity	144			V		
Flaws in traffic controller requirements definition process and/or training methodology	145		V			
Lack of or poor communication quality	146		V	V		
Lack of adherence to ICAO Annex 14 and related documents in terms of airside lights distribution	147		V	V		
Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	148		V	V		
Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149			V		
Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150			V		
Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151			V		
Inadequate stall recovery procedure for the aircraft	152				V	
Inadequate management / separation of takeoffs and landings	153		V		•	
Callsign confusion	154		V	V		
Current airport diagram not reflecting critical changes	155		*	V		
Lack of adherence to SOP in terms of awareness on supporting systems						
(warning) - RIMCAS.	156			V		
Takeoff without clearance	157			V		
Landing without clearance	158			V		
Inadequate de-icing method applied	159			V		



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Lack of adherence to Rules of the Air - runway used for alternating take- offs and landings	160		V	V	
Inadequate certification process and / or flaws in methodology					
concerning verification of the system / product compliance with requirements - stickshaker system components	161				V
Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162		V		
Lack of adherence to SOP in terms of ATCO and approach or ground controller communication	163		V		
Unintuitive and / or error prone system manual - ground radar.	164		V		V
Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with	165		V		V
requirements - Ground Radar					
Lack of adherence to ICAO Annex 14 and related documents in terms of nonrestricted view on airsite from TWR	166		V	V	
Pilot tiredness - Inadequate workload distribution	167			V	
Flaws in pilot requirements definition process and/or training	168			V	
methodology	4.50				
Hearback ommitted	169		V	V	
Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ground radar at the airport.	170		V	V	
Lack of adherence to SOP in terms of awareness on supporting systems (warning) - ground radar.	171		V	V	
Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of Runway Conflict Warning System.	172		V	V	
	173			V	
Lack of adherence to emergency procedures - WEM Late activation of pedal braking or takeover from autobrake, when so	173			V	
required					
Delayed selection of reverse thrust	175			V	
Late thrust reduction or power-on touchdown	176			V	
Failure to arm ground-spoilers	177			V	
Inappropriate selection of autobrake mode for given runway length and condition	178			V	
Gross error in takeoff weight entry and/or in V1 / VR speeds assessment	179			V	
Inadequate aircraft de-icing / anti-icing	180			V	
Incorrect use of automation -Engine anti-ice system	181			V	
Aggressive maneuvering / overcontrolling	182			V	
Excessive pitch attitude	183			V	
Excessive bank angle	184			V	
Flight below maneuvering speeds	185			V	
Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with	186			-	V
requirements - Compressor in the engine	100				•
Flaws in manufacturer quality control process - Compressor in the engine.	187				V
Flaws in aircraft system maintenance process definition - Compressor in the engine.	188	V			
Flaws in manufacturer quality control process - Engine accessory drive components.	189				V
Flaws in aircraft system maintenance process definition - Engine	190	V			
accessory drive components.					
Inadequate certification process and / or flaws in methodology			1	l .	١,,,
concerning verification of the system / product compliance with	191				V
Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine accessory drive components. Incorrect use of automation - TOCW System	191 192			V	V



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	1		I		
Inadequate certification process and / or flaws in methodology	_				
concerning verification of the system / product compliance with	194			V	
requirements - ECAM (or similar) system components.					
Flaws in aircraft system maintenance process definition - ECAM (or	195	V			
similar) system components.		·			
Inadequate certification process and / or flaws in methodology					
concerning verification of the system / product compliance with	196		V	V	
requirements - marshalling/rolling/taxiing control related system and	130		•	•	
components (incl. brake)					
Lack of adherence to SOP in terms of awareness on supporting systems	197			V	
warning - stickshaker	137			V	
Lack of adherence to SOP for take-off procedure in terms of determining	198			V	
of aircraft configuration.	130			V	
Poor application of T/O & RTO procedure, braking initiation sequence	199			V	
Poor application of T/O & RTO procedure, use of MET / ATIS	200			.,	
information, aircraft handling	200			V	
Lack of adherence to SOP for take-off procedure in terms of checking	201				
take-off configuration before application of take-off power.	201			V	
Lack of adherence to AFM limitations for Take-off	202			V	
Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in					
terms of RWY surface condition. Snow / ice presence / or runway	203		V	V	
surface friction rate below minimum				•	
Flaws in aircraft system maintenance process definition - TOCW System	204	V			
Inadequate certification process and / or flaws in methodology	204	•			
concerning verification of the system / product compliance with	205				V
requirements - RCWS	203				V
Unintuitive and / or error prone system manual - Engine anti-icing					
system	206				V
Poor application of T/O & RTO procedure, adherence to SOP, criteria for					
STOP decision	207			V	
Poor application of T/O procedure, use of MET / ATIS information,					
	208			V	
aircraft de-icing					
Poor application of T/O & RTO procedure, failure recognition and	209			V	
preparedness					
Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing	210			V	
procedure.					
High energy RTO rate is an indicator of improper Operator's policy for	211			V	
T/O operations.				•	
Lack of adherence to SOP in terms of anti-icing fluid Holdover time	212			V	
(HOT)	212			·	
Inadequate certification process and / or flaws in methodology					
concerning verification of the system / product compliance with	213			V	
requirements - antiice fluid HOT					
Lack of adherence to SOP for AIR operations in terms of alerting of flight	214			V	
crew on windshear appeared	214			V	
Lack of adherence to the current technology standards in terms of flight	215	\/			
safety supporting systems. Lack of PWS System.	215	V			
Lack of adherence to ICAO Annex 14 SARPs in terms of RWY	246			.,	
maintenance - presence of contaminations.	216			V	
Unintuitive and / or error prone system manual - FMC	217				V
Lack of adherence to SOP in terms of fuelling procedure	218			V	· ·
Unintuitive and / or error prone system manual - TOCW	219			•	V
Lack of adherence to the current technology standards in terms of flight	213				,
safety supporting systems. Lack of fire detection / warning or / and	220	V			
extinguishing system.	220	v			
	221				V
Inadequate effectiveness of fire extinguishing system	221				V



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Flaws in manufacturer quality control process - TOCW system	222			V
components	222			V
Use of non-standard phraseology by pilot flying (PF) and/or pilot not flying (PNF)	223		V	
Lack of adherence to the SOP in terms of critical indicators cross- checking	224		٧	
Lack of adherence to SARPs included in Annex 14 and related documents				
in terms of RWY parameters and location, attitude, approach path	225	V	V	
parameters and obstacles locations (e.g. mountains).				
Lack of adherence to the SOP in terms of critical manoeuvre execution	226		V	
Lack of adherence to SOP in terms of AFM limitations	227		V	
Applied de-icing / anti-icing method is not sufficient for predicted	228		V	
conditions	228		V	
Inadequate certification process and / or flaws in methodology				
concerning verification of the system / product compliance with	229			V
requirements - TOCW System				
Inadequate certification process and / or flaws in methodology				
concerning verification of the system / product compliance with	230			V
requirements - Power supply system components				
Lack of adherence to SOP in terms of aircraft icing (condition)	231		V	
monitoring			·	
Lack of adherence to SOP in terms of de-icing / anti-icing procedures.	232		V	
Lack of adherence to SOP during aircraft storage and / or maintenance	233		V	
in terms of protecting of critical aircraft systems against contamination	233		·	
Lack of adherence to SOP in terms of requested information support for	234		V	
other aircraft in terms of adverse weather conditions			·	
Lack of adherence to SARPs in terms of avoiding adverse weather	235		V	
conditions during flight			·	
Incorrect weather report obtained by the flight crew	236	V		
Lack of adherence to SOP in terms of providing flight crew with current	237		V	
weather report				
Flaws in manufacturer quality control process - Power supply system	238			V
components				
Lack of adherence to SOP in terms of application of findings from	239	V	V	
weather report				
Lack of adherence of passengers to the recommendation: Fasten seat belt while seated	240		V	
Lack of adherence to SOP in terms of "fasten your seat belt" information				
activation in passenger cabin during flight in turbulence conditions	241		V	
Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ECAM.	242		V	
Error in calculation of necessary amount of fuel	243		V	
Lack of adherence to SOP in terms of awareness on supporting systems	243		V	
warning	244		V	
Lack of adherence to SOP in terms of approach and landing	245		V	
Lack of adherence to SOP in terms of approach and randing Lack of adherence to SOP in terms of briefing and checklist before	273		V	
initiating of approach and landing	246		V	
Lack of adherence to SOP for approach and landing	247		V	
Lack of adherence to the current technology standards in terms of flight				
safety supporting systems. Lack of ILS on descent path	248	V	V	
Lack of adherence to SARPs included in Annex 14 and related documents				
in terms of temporary suspension of operation on airport in the case of	249		V	
adverse weather.	-			
Lack of adherence to AIR OPS normal procedures in terms of missed	2			
approach execution procedure	250		V	
Lack of adherence to AFM limitations for landing	251		V	
<u> </u>				



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Flores to a transfer or the contract of the co					l
Flaws in aircraft system maintenance process definition - Electrical wiring System	252	V			
Inadequate certification process and / or flaws in methodology					
concerning verification of the system / product compliance with	253				V
requirements - PWS system					
Lack of adherence to SOP in terms of necessary amount of fuel	254			V	
Lack of adherence to SOP in terms of load sheet preparation and	255			V	
verification	233			V	
Lack of adherence to the current technology standards in terms of flight	256	V			
safety and efficiency - fuel tank allocation.	230				
Lack of adherence to SOP in terms of AFM limitations in terms of weigh	257			V	
and balance					
Incorrect stab-trim setting	258			V	
Undetected incorrect takeoff configuration	259			V	
Poor application of T/O & RTO procedure, computation of T/O	260			V	
parameters	200			·	
Inadequate certification process and / or flaws in methodology					
concerning verification of the system / product compliance with	261				V
requirements - Ground equipment					
Gross error in takeoff weight entry and/or in V1 / VR speeds assessment	262			V	
Flaws in CRM training procedures	263			V	
Lack of adherence to the main CRM rules	264			V	
Incorrect use of automation - Anti-icing system	265			V	
Flaws in manufacturer quality control process - Stickshaker system	266				V
components	200				v
Difference indications of independent aircraft speed / altitude or	267				V
attitude indicators	207				v
Flaws in aircraft system maintenance process definition - Braking system	268	V			
related components					
Incorrect use of automation - FMS	269			V	
Flaws in aircraft system maintenance process definition -	270	V			
Communication equipment systems and components.	270				
Inadequate certification process and / or flaws in methodology					
concerning verification of the system / product compliance with	271				V
requirements - Communication equipment systems and components.					
Flaws in manufacturer quality control process - Communication	272				V
equipment systems and components.					•
Lack of adherence to SOP in terms of safety best practices	273		V	V	
Altimeter setting error	274			V	V
Failure to check navigation accuracy before approach	275		V	V	
Inadequate certification process and / or flaws in methodology					
concerning verification of the system / product compliance with	276				V
requirements - Rudder components.					
Flaws in aircraft system maintenance process definition - Rudder	277	V			
components.					
Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA	278		V		
and/or toward high terrain)			, v		
Flaws in manufacturer quality control process - Rudder components.	279				V
Inadequate certification process and / or flaws in methodology					
concerning verification of the system / product compliance with	280				V
requirements - Horizontal stabilizer components.					
Premature descent to DA(H) before G/S intercept or premature descent	281			V	
to MDA(H) before final-descent-point / FAF	201			v	
Premature descent below MDA(H) before reaching the visual-descent-	282			V	
point (VDP)					
Flight below desired flight path during initial and/or final approach	283			V	



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Continued approach, when below DA(H) or MDA(H), after loss of visual references	284			V	
Flaws in aircraft system maintenance process definition - Horizontal stabilizer components.	285	V			
Late or inadequate response to MSAW warning	286			V	
Flaws in manufacturer quality control process - Horizontal stabilizer				-	
components.	287				V
Inadequate certification process and / or flaws in methodology					
concerning verification of the system / product compliance with	288				V
requirements - Components of Wing control surface system.					
Failure to go-around, when so required	289			V	
Inadequate certification process and / or flaws in methodology					
concerning verification of the system / product compliance with	290				V
requirements - ACAS system components					
Failure to follow published missed-approach procedure	291			V	
Lack of adherence to AFM in terms of emergency procedures - stall	202			.,	
recovery	292			V	
Lack of adherence to the current technology standards in terms of flight	202	.,			
safety supporting systems. Lack of GPWS	293	V			
Lack of adherence to SOP for take-off procedure in terms of altimeter	204			V	
calibration.	294			V	
Lack of adherence to SARPs included in Annex 14 and related documents					
in terms of RWY parameters and location, approach path parameters	295			V	
and obstacles locations.					
Lack of adherence to Rules of the Air - adherence to Controller clearance	296			V	
Lack of adherence to TO procedure in terms of antiice protection	297			V	
Flaws in manufacturer quality control process - PWS system components	298				V
Inadequate certification process and / or flaws in methodology					
concerning verification of the system / product compliance with	299				V
requirements - FMS subsystems and components (autopilot incl.)					
Tactical or / and Planning Controller tiredness - Inadequate workload	300		V		
distribution	300		V		
Flaws in Tactical or / and Planning Controller requirements definition	301		V		
process and/or training methodology	301		V		
Lack of adherence to the current technology standards in terms of flight	302	V			
safety supporting systems. Lack of MSAW system.	302	· ·			
Lack of adherence to SOP. Lack of awareness and immediate answer on	303		V	V	
supporting systems warning. Navigational aid failure.	303		V	v	
Imbalanced and inappropriate relation between cpt and his	304			V	
subordinates	301			·	
Unintuitive and / or error prone system manual - communication	305				V
equipment.	303				·
Flaws in manufacturer quality control process - FMS subsystem and	306				V
components (autopilot incl.)	555				·
Lack of adherence to SOP for AIR operations in terms of controller error	307		V		
in approach clearance instruction	507		·		
Not recognized ground Navaids System failure not reflected in NOTAM	308		V		
messages	300		•		
Lack of adherence to SOP in terms of pre-flight inspections - ice	309			V	
presence on aircraft					
Flaws in manufacturer quality control process - anti-ice fluid	310				V
specifications (HOT)					
Flaws in aircraft system maintenance process definition - Components of	311	V			
Wing control surface system.		-			
Altitude deviation	312			V	
Level bust (pilot lapse or late re-clearance by ATC)	313		V	V	



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Flaws in manufacturer quality control process - Components of Wing	314				V
control surface system.	315			V	
Failure to comply with an altitude or speed restriction / constraint Inadequate certification process and / or flaws in methodology	315			V	
concerning verification of the system / product compliance with	316				V
requirements - Autothrottle system in the engine	210				V
	317			V	
Navigation deviation					
Inappropriate visual avoidance manoeuvre	318			V	
Flaws in aircraft system maintenance process definition - ADI system components	319				V
Inadequate certification process and / or flaws in methodology					
concerning verification of the system / product compliance with	320				V
requirements - ADI system components	320				V
	224		V		
Inadequate coordination between ATM centers and/or ATC sectors	321		V		
Flaws in manufacturer quality control process - ADI system components	322				V
Flaws in Airspace and Air Traffic planning procedures design process	323		V		
Flaws in manufacturer quality control process - Autothrottle system in	324				V
the engine.					
Flaws in aircraft system maintenance process definition - Autothrottle	325		V		
system in the engine.	323		,		
Flaws in conflict and separation minima infringement detection /	326		V		
elimination procedures	323		•		
Lack of adherence of airlines to time constraints and deadlines in terms					
of providing the Network Manager Operation Centre with obligatory	327			V	
data.					
Inadequate certification process and / or flaws in methodology					
concerning verification of the system / product compliance with	328				V
requirements - MTCD System					
Lack of adherence of airlines to declared Flight Plan.	329			V	
Failure to identify the pre-tactical conflict before it reach the tactical	220		.,		
controller	330		V		
Lack of adherence to SOP for Airborne operation in terms of minimum	224		.,		
separation	331		V		
Inadequate certification process and / or flaws in methodology					
concerning verification of the system / product compliance with	332				V
requirements - Thrust reverse system in the engine.					
Inadequate certification process and / or flaws in methodology					
concerning verification of the system / product compliance with	333				V
requirements - Hydraulic system components					
Flaws in aircraft system maintenance process definition - Hydraulic					
System	334	V			
Flaws in manufacturer quality control process - Thrust reverse system in					
the engine.	335				V
Incorrect use of communication equipment	336		V	V	
Flaws in aircraft system maintenance process definition - Thrust reverse			· ·	v	
system in the engine.	337	V			
Lack of adherence to emergency procedures - recovery from severe FCS					
failure	338			V	
Military activity in controlled airport or located within controlled area	339		V		
General aviation activity in controlled airport or located within controlled area	333		V		
	340		V		
controlled area					
Inadequate certification process and / or flaws in methodology	244				.,
concerning verification of the system / product compliance with	341				V
requirements - Integrity of primary aircraft structure.					
Intensified traffic related to general aviation activity e. g. over GA airport	342		V		
/ airfield Deviation from flight trajectory commanded by controller			V		
	343				



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Lack of adherence to the current technology standards in terms of flight	344	V			
safety supporting systems. Lack of STCA System.	344	V			
Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.	345	V			
Lack of adherence to regulations concerning independent ATCO monitoring	346		V		
Lack of adherence to the current technology standards in terms of flight					
safety supporting systems. Lack of ACAS installed on aircraft.	347	V			
Flaws in manufacturer quality control process - Integrity of primary	240				.,
aircraft structure.	348				V
Late or inadequate response to ACAS warning	349			V	
Lack of adherence to emergency procedures - flight deck smoke	350			V	
procedure	330			V	
Inadequate certification process and / or flaws in methodology					
concerning verification of the system / product compliance with	351				V
requirements - STCA System					
Inadequate certification process and / or flaws in methodology					
concerning verification of the system / product compliance with	352				V
requirements - Fuel system components					
Inadequate maintenance of fire vulnerable aircraft parts or components	353	V			
Inadequate certification process and / or flaws in methodology					
concerning verification of the system / product compliance with	354				V
requirements in terms of fire resistance					
Lack of adherence to the current technology standards in terms of flight	355	V			
safety supporting systems. Lack of LLWAS System.					
Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with	356				V
requirements - LLWAS system	330				V
Lack of adherence to AFM in terms of emergency procedures -					
windshear recovery	357			V	
Inadequate certification process and / or flaws in methodology					
concerning verification of the system / product compliance with	358				V
requirements - Landing gear components					-
Lack of adherence to regulations concerning transport of DGR goods	359			V	
Separation of structural element / component of the aircraft during	250				
take-off or landing	360	V			
Flaws in aircraft system maintenance process definition - Fuel system	261				
components	361	V			
Inadequate certification process and / or flaws in methodology					
concerning verification of the system / product compliance with	362				V
requirements - Reduction gear in the engine					
Flaws in manufacturer quality control process - Reduction gear in the	363				V
engine.	303				V
Flaws in aircraft system maintenance process definition - Reduction gear	364	V			
in the engine.	301				
Flaws in manufacturer quality control process -					
marshalling/rolling/taxiing control related system and components (incl.	365				V
brake).					
Flaws in aircraft system maintenance process definition -	266				
marshalling/rolling/taxiing control related system and components (incl.	366	V			
brake).	267			17	
Taxiing without clearance	367			V	
Late rejected takeoff decision / initiation	368			V	
Flaws in manufacturer quality control process - ECAM (or similar) system	369				V
components. Lack of adherence to emergency procedures - Fuel starvation	370			V	
Slow rotation (i.e., low pitch rate)	370			V	
Siow rotation (i.e., iow pitch fate)	3/1			V	



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Flaws in manufacturer quality control process - Fuel system components.	372			V
Flaws in manufacturer quality control process - Pneumatic system components.	373			V
Flaws in aircraft system maintenance process definition - Pneumatic system components.	374	V		
Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Pneumatic system components.	375			V
Flaws in manufacturer quality control process - Landing gear components.	376			V
Flaws in aircraft system maintenance process definition - Landing gear components.	377	V		
Flaws in manufacturer quality control process - Drag control system components.	378			V
Flaws in aircraft system maintenance process definition - Drag control system components.	379	V		
Unintuitive and / or error prone system manual - ECAM	380			V
Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Drag control system components.	381			V
Flaws in manufacturer quality control process -other critical flight instruments and systems.	382			V
Flaws in aircraft system maintenance process definition - other critical flight instruments and systems.	383	V		
Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations	384		V	
Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - other critical flight instruments and systems.	385			V
Flaws in manufacturer quality control process -Hydraulic system components.	386			V
Flaws in aircraft system maintenance process definition - Power supply system components	387	V		
Poor application of T/O & RTO procedure, aircraft handling	388		V	
Lack of adherence to the SOP in terms of critical manoeuvre execution - flare	389		V	
Extreme operation condition / poor maintenance quality / advanced life length	390	V	V	
Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components	391			V
Flaws in aircraft system maintenance process definition - Aircraft door system and / or components	392	V		
Flaws in manufacturer quality control process - Aircraft door system and / or components	393			V
Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Anti-icing system components	394			V
Flaws in manufacturer quality control process - Anti-icing system components	395			V
Flaws in aircraft system maintenance process definition - Anti-icing systems components	396	V		
Unintuitive and / or error prone system manual - Anti-icing system	397			V
Lack of adherence to SOP in terms of pre-flight inspections -presence of anti-contamination covers on pitot static tube	398		V	



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Lack of adherence to SOP in terms of briefing and checklist before initiating of start of taxiing and take-off	399			V	
Flaws in airport capacity management process	400		V	V	
Lack of adherence to SARPs included in ICAO Annex 14 in terms of			V	-	
airport fence integrity monitoring	401			V	
Unintuitive and / or error prone system manual - On-board weather					
radar.	402				V
Incorrect use of automation - On-board weather radar	403			V	
Lack of adherence to SOP for take-off procedure in terms of time	404			.,	
limitation for take-off preparation.	404			V	
Inadequate certification process and / or flaws in methodology					
concerning verification of the system / product compliance with	405				V
requirements - Pitot static system components					
Flaws in manufacturer quality control process - Pitot static system	406				V
components	400				·
Flaws in aircraft system maintenance process definition - Pitot static	407	V			
systems components		-			
Inadequate airline / regulatory provider policy in terms of aware of the	408			V	
risks related to air travel	400				
Lack of adherence to engine limitations	409			V	
Flaws in aircraft system maintenance process definition - FMS	410	V			
subsystems and components (autopilot incl.) Inadequate certification process and / or flaws in methodology					
concerning verification of the system / product compliance with	411				V
requirements - MSAW System	411				V
Descent above desired descent profile	412			V	
High energy approach due to lack of adequate planning or due to	412			V	
challenging design of STAR (high fix-crossing-altitudes,) or					
challenging ATC instructions (late descent, vectors, altitude or speed	413			V	
restrictions,)					
Late deceleration and configuration set-up for approach and landing	414			V	
DME / ILS DME confusion in assessing the final descent point / FAF	415			V	
Unstabilized final approach (high, fast, steep,)	416			V	
Tailwind component above limit	417			V	
Failure to remember / assess crosswind component limit for prevailing					
runway condition	418			V	
Lack of adherence to SOP for take-off procedure in terms of speed bug	410			.,	
checklist preparation and verification.	419			V	
Inadequate certification process and / or flaws in methodology					
concerning verification of the system / product compliance with	420				V
requirements - FCS system or components					
Flaws in manufacturer quality control process - FCS system components	421				V
Flaws in aircraft system maintenance process definition - FCS systems or	422	V			
components	722	v			
Inadequate certification process and / or flaws in methodology					
concerning verification of the system / product compliance with	423				V
requirements - Engine anti-ice systems and / or components					
Flaws in manufacturer quality control process - Engine anti-ice system	424				V
and / or components				٠,,	
Inadequate crosswind landing / decrab technique	425			V	
Long / floating flare	426			V	
Touchdown off centerline	427			V	
					V
Flaws in aircraft system maintenance process definition - Engine anti-ice	428				
system and / or components	428				
	428			V	



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Lack of adherence to SOP in terms of pre-flight inspections - cargo				
securing quality	431		V	
Inadequate use of differential braking	432		V	
Use of nose wheel steering tiller during rollout	433		V	
Lack of adherence to the current technology standards in terms of flight safety and efficiency - engines location.	434	V		
Inadequate certification process and / or flaws in methodology				
concerning verification of the system / product compliance with	435			V
requirements - ADI				
Flaws in manufacturer quality control process - ADI	436			V
Flaws in aircraft system maintenance process definition - ADI	437	V		
Lack of adherence to AFM in terms of emergency procedures - engine	420		V	
failure	438		V	
Inadequate certification process and / or flaws in methodology				
concerning verification of the system / product compliance with	439			V
requirements - ASI				
Flaws in manufacturer quality control process - ASI	440			V
Flaws in aircraft system maintenance process definition - ASI	441	V		
Inadequate certification process and / or flaws in methodology				
concerning verification of the system / product compliance with	442			V
requirements - PFD				
Flaws in manufacturer quality control process - PFD	443			V
Flaws in aircraft system maintenance process definition - PFD	444	V		
Inadequate certification process and / or flaws in methodology				
concerning verification of the system / product compliance with	445			V
requirements - On-board weather radar				
Flaws in manufacturer quality control process - On-board weather radar	446			V
Flaws in aircraft system maintenance process definition - On-board	447	V		
weather radar		·		
Lack of adherence to emergency procedures - control recovery	448		V	
Inadequate certification process and / or flaws in methodology				
concerning verification of the system / product compliance with	449			V
requirements - Engine fuel distribution system				
Flaws in manufacturer quality control process - Engine fuel distribution	450			V
system				
Flaws in aircraft system maintenance process definition - Engine fuel	451	V		
distribution system	452			
Flaws in manufacturer quality control process - Engine sensors	452	.,		V
Flaws in aircraft system maintenance process definition - Engine sensors	453	V		
Inadequate certification process and / or flaws in methodology	454			V
concerning verification of the system / product compliance with requirements - Engine systems and / or components	454			V
Flaws in aircraft system maintenance process definition - Oil distribution				
system	455	V		
Inadequate certification process and / or flaws in methodology				
concerning verification of the system / product compliance with	456			V
requirements - Oil distribution system	430			V
Flaws in manufacturer quality control process - Oil distribution system	457			V
Flaws in manufacturer quality control process - Engine systems and / or				-
components	458			V
Flaws in aircraft system maintenance process definition - Engine				
combustor	459	V		
Inadequate certification process and / or flaws in methodology				
concerning verification of the system / product compliance with	460			V
requirements - Engine combustor				
Flaws in manufacturer quality control process - Engine combustor	461			V



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landaruska aukifirakian angaran and / auflauri in makhadalam.	1 1		<u> </u>		
Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with	462				V
requirements - Engine sensors	402				v
Flaws in aircraft system maintenance process definition - Engine systems and / or components	463	V			
Inadequate certification process and / or flaws in methodology					
concerning verification of the system / product compliance with	464				V
	404				V
requirements - APU systems and / or components					
Flaws in manufacturer quality control process - APU systems and / or	465				V
components					
Flaws in aircraft system maintenance process definition - APU systems	466	V			
and / or components					
Inadequate certification process and / or flaws in methodology					
concerning verification of the system / product compliance with	467				V
requirements - Electrical / wiring system components					
Flaws in manufacturer quality control process - Electrical / wiring	468				V
systems components					-
Flaws in aircraft system maintenance process definition - Engine turbine	470	V			
components	170	·			
Inadequate certification process and / or flaws in methodology					
concerning verification of the system / product compliance with	471				V
requirements - Engine turbine components					
Flaws in manufacturer quality control process - Engine turbine	472				V
components	4/2				V
Flaws in aircraft system maintenance process definition - Fire detection	474	V			
system components	4/4	V			
Inadequate certification process and / or flaws in methodology					
concerning verification of the system / product compliance with	475				V
requirements - Fire deection system components					
Flaws in manufacturer quality control process - Fire detection system	.=.				
components	476				V
Flaws in aircraft system maintenance process definition - Fire warning					
system	477	V			
Inadequate certification process and / or flaws in methodology					
concerning verification of the system / product compliance with	478				V
requirements - Fire warning system					-
Flaws in manufacturer quality control process - Fire warning system	479				V
Inadequate certification process and / or flaws in methodology	5				•
concerning verification of the system / product compliance with	480				V
requirements - Fire extinguishing system components	400				v
Flaws in aircraft system maintenance process definition - Fire					
extinguishing system components	481	V			
Flaws in manufacturer quality control process - Fire extinguishing system					
	482				V
components Lack of adherence to AFM in terms of emergency procedures - fire					
	483			V	
detection and extinguishing procedure					
Unintuitive and / or error prone system manual - fire extinguishing	484				V
system					
Flaws in aircraft system maintenance process definition - GPWS system	485	V			
components					
Inadequate certification process and / or flaws in methodology					
concerning verification of the system / product compliance with	486				V
requirements - GPWS system components					
Flaws in manufacturer quality control process - GPWS system	487				V
components	.5,				ď
Flaws in aircraft system maintenance process definition - Ground	488	V			
navigational systems and components (e.g. ILS)	-100	٧			



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Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS)	489			V
Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS)	490			V
Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491	V		
Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492			V
Flaws in manufacturer quality control process - Onboard navigational systems and components.	493			V
Unintuitive and / or error prone system manual - FMS	494			V
Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. MSAW warning.	495		V	
Flaws in manufacturer quality control process - CPCS system and / or components	496			V
Flaws in aircraft system maintenance process definition - CPCS system and / or components	497	V		
Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - CPCS system and / or components	498			V
Incorrect use of automation - CPCS	499		V	
Unintuitive and / or error prone system manual - CPCS	500			V



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Appendix D Safety Performance Indicators

List of Safety Po	erfor	mance Indicators	DIRECTIVE 2003/42/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 13 June 2003 on occurrence reporting in civil aviation
Technology	1	Rate of autoflight	Appendix to ANNEX I
		system failures/flight	2. Autoflight system
			(a) failure of the autoflight system to achieve the intended operation while engaged
			(b) significant reported crew difficulty to control the aircraft linked to autoflight system functioning
			(c) failure of any autoflight system disconnect device
			(d) uncommanded autoflight mode change.
Technology	2	Rate of electrical	Appendix to ANNEX I
		power system	4. Electrical system
		failures/flight	(a) loss of one electrical distribution system (AC/DC)
			(b) total loss or loss of more than one electrical generation system
			(c) failure of the back up (emergency) electrical generation system.
Technology	3	Rate of flight control	Appendix to ANNEX I
		system failures/flight	7. Flight controls
			(a) asymmetry of flaps, slats, spoilers, etc.
			(b) limitation of movement, stiffness or poor or delayed response in the operation of primary flight control systems
			or their associated tab and lock systems
			(c) flight control surface runaway
		(d) flight control surface vibration felt by the crew	
			(e) mechanical flight control disconnection or failure
			(f) significant interference with normal control of the aircraft or degradation of flying qualities.
Technology	4	Rate of fuel system	ANNEX I
	failures/flight	A. AIRCRAFT FLIGHT OPERATIONS	
			(i) Operation of the aircraft
			(q) Fuel system malfunctions or defects, which had an effect on fuel supply and/or distribution.
			Appendix to ANNEX I
			8. Fuel system
			(a) fuel quantity indicating system malfunction resulting in total loss or wrong indication of fuel quantity on board
			(b) leakage of fuel which resulted in major loss, fire hazard, significant contamination



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List of Safety Performance Indicators			DIRECTIVE 2003/42/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 13 June 2003 on occurrence reporting in civil aviation
			(c) malfunction or defects of the fuel jettisoning system which resulted in inadvertent loss of significant quantity,
			fire hazard, hazardous contamination of aircraft equipment or inability to jettison fuel
			(d) fuel system malfunctions or defects which had a significant effect on fuel supply and/or distribution
			(e) inability to transfer or use total quantity of usable fuel.
Technology	5	Rate of hydraulic	ANNEX I
		power system	A. AIRCRAFT FLIGHT OPERATIONS
		failure/flight	(i) Operation of the aircraft
			(u) Inability to achieve the intended aircraft configuration for any flight phase (e.g. landing gear and gear doors,
			flaps, stabilisers, slats etc.).
			(k) Leakage of hydraulic fluids, fuel, oil or other fluids which resulted in a fire hazard or possible hazardous
			Appendix to ANNEX I
			9. Hydraulics
			(a) loss of one hydraulic system (ETOPS only)
			(b) failure of the isolation system
			(c) loss of more than one hydraulic circuit
			(d) failure of the back-up hydraulic system
			(e) inadvertent ram air turbine extension.
Technology	6	Rate of ice/rain	Appendix to ANNEX I
		protection system failures/flight	10. Ice detection/protection system
			(a) undetected loss or reduced performance of the anti-ice/de-ice system
			(b) loss of more than one of the probe-heating systems
			(c) inability to obtain symmetrical wing de-icing
			(d) abnormal ice accumulation leading to significant effects on performance or handling qualities
			(e) crew vision significantly affected.
Technology	7	Rate of landing gear system failures/flight	ANNEX I
		System ramures/mgmt	A. AIRCRAFT FLIGHT OPERATIONS
			(i) Operation of the aircraft
			(u) Inability to achieve the intended aircraft configuration for any flight phase (e.g. landing gear and gear doors,
			flaps, stabilisers, slats etc.).
			(x) Operation of any primary warning system associated with manoeuvring the aircraft e.g. configuration



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List of Safety Performance Indicators			DIRECTIVE 2003/42/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 13 June 2003 on occurrence reporting in civil aviation
Technology	8	Rate of navigation system failures/flight	warning, stall warning (stick shaker), over-speed warning etc. unless: 3. the warning results from failure to select landing gear or landing flaps by the appropriate point on the approach (mode 4); or 12. Landing gear system/brakes/tyres (a) brake fire (b) significant loss of braking action (c) asymmetrical braking action leading to significant path deviation (d) failure of the landing gear free fall extension system (including during scheduled tests) (e) unwanted landing gear or gear doors extension/retraction (f) multiple tyre burst. ANNEX I A. AIRCRAFT FLIGHT OPERATIONS (i) Operation of the aircraft (o) Incorrect programming of, or erroneous entries into, equipment used for navigation or performance calculations, or use of incorrect data. D. AIR NAVIGATION SERVICES, FACILITIES AND GROUND SERVICES (i) Air navigation services (ANS) 13. Navigation systems (including precision approach systems) and air data systems (a) total loss or multiple navigation equipment failures (b) total or multiple air data system equipment failures (c) significant misleading indications (d) significant navigation errors attributed to incorrect data or a database
			(e) unexpected deviations in lateral or vertical path not caused by pilot input (f) problems with ground navigational facilities leading to significant navigation errors not associated with
Technology	9	Rate of powerplant system failures/flight	transitions from inertial navigation mode to radio navigation mode. ANNEX I A. AIRCRAFT FLIGHT OPERATIONS (iii) Propulsion (including engines, propellers and rotor systems) and auxiliary power units (APUs)
			(a) Flameout, shutdown or malfunction of any engine.



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(b) Overspeed or inability to control the speed of any high-speed rotat component (for example: APU, air starter, air cycle machine, air turbine motor, propeller or rotor). (c) Failure or malfunction of any part of an engine or powerplant resul in any one or more of the following: 1. non-containment of components/debris; 2. uncontrolled internal or external fire, or hot gas breakout; 3. thrust in a direction different from that demanded by the pilot; 4. thrust-reversing system failing to operate or operating inadvertently 5. inability to control power, thrust or rpm; 6. failure of the engine mount structure; 7. partial or complete loss of a major part of the powerplant; 8. dense visible fumes or concentrations of toxic products sufficient to incapacitate crew or passengers; 9. inability, by use of normal procedures, to shutdown an engine; 10. inability to restart a serviceable engine. (d) An uncommanded thrust/power loss, change or oscillation which is classified as a loss of thrust or power control (LOTC): 1. for a single-engine aircraft; or 2. where it is considered excessive for the application; or where this could affect more than one engine in a multi-engine aircraft particularly in the case of a twin-engine aircraft; or	List of Safety Performan	DIRECTIVE 2003/42/EC OF THE EUROPEAN PARLIAMENT A THE COUNCIL of 13 June 2003 on occurrence reporting in civil aviation	AND OF
(c) Failure or malfunction of any part of an engine or powerplant resul in any one or more of the following: 1. non-containment of components/debris; 2. uncontrolled internal or external fire, or hot gas breakout; 3. thrust in a direction different from that demanded by the pilot; 4. thrust-reversing system failing to operate or operating inadvertently 5. inability to control power, thrust or rpm; 6. failure of the engine mount structure; 7. partial or complete loss of a major part of the powerplant; 8. dense visible fumes or concentrations of toxic products sufficient to incapacitate crew or passengers; 9. inability, by use of normal procedures, to shutdown an engine; 10. inability to restart a serviceable engine. (d) An uncommanded thrust/power loss, change or oscillation which is classified as a loss of thrust or power control (LOTC): 1. for a single-engine aircraft; or 2. where it is considered excessive for the application; or where this could affect more than one engine in a multi-engine aircraft particularly in the case of a twin-engine aircraft; or			rotating
in any one or more of the following: 1. non-containment of components/debris; 2. uncontrolled internal or external fire, or hot gas breakout; 3. thrust in a direction different from that demanded by the pilot; 4. thrust-reversing system failing to operate or operating inadvertently 5. inability to control power, thrust or rpm; 6. failure of the engine mount structure; 7. partial or complete loss of a major part of the powerplant; 8. dense visible fumes or concentrations of toxic products sufficient to incapacitate crew or passengers; 9. inability, by use of normal procedures, to shutdown an engine; 10. inability to restart a serviceable engine. (d) An uncommanded thrust/power loss, change or oscillation which is classified as a loss of thrust or power control (LOTC): 1. for a single-engine aircraft; or 2. where it is considered excessive for the application; or where this could affect more than one engine in a multi-engine aircraft particularly in the case of a twin-engine aircraft; or		starter, air cycle machine, air turbine motor, propeller or rotor).	
1. non-containment of components/debris; 2. uncontrolled internal or external fire, or hot gas breakout; 3. thrust in a direction different from that demanded by the pilot; 4. thrust-reversing system failing to operate or operating inadvertenth 5. inability to control power, thrust or rpm; 6. failure of the engine mount structure; 7. partial or complete loss of a major part of the powerplant; 8. dense visible fumes or concentrations of toxic products sufficient to incapacitate crew or passengers; 9. inability, by use of normal procedures, to shutdown an engine; 10. inability to restart a serviceable engine. (d) An uncommanded thrust/power loss, change or oscillation which is classified as a loss of thrust or power control (LOTC): 1. for a single-engine aircraft; or 2. where it is considered excessive for the application; or where this could affect more than one engine in a multi-engine aircraft particularly in the case of a twin-engine aircraft; or		1	resulting
2. uncontrolled internal or external fire, or hot gas breakout; 3. thrust in a direction different from that demanded by the pilot; 4. thrust-reversing system failing to operate or operating inadvertenth 5. inability to control power, thrust or rpm; 6. failure of the engine mount structure; 7. partial or complete loss of a major part of the powerplant; 8. dense visible fumes or concentrations of toxic products sufficient to incapacitate crew or passengers; 9. inability, by use of normal procedures, to shutdown an engine; 10. inability to restart a serviceable engine. (d) An uncommanded thrust/power loss, change or oscillation which is classified as a loss of thrust or power control (LOTC): 1. for a single-engine aircraft; or 2. where it is considered excessive for the application; or where this could affect more than one engine in a multi-engine aircraft particularly in the case of a twin-engine aircraft; or		following:	
3. thrust in a direction different from that demanded by the pilot; 4. thrust-reversing system failing to operate or operating inadvertenth 5. inability to control power, thrust or rpm; 6. failure of the engine mount structure; 7. partial or complete loss of a major part of the powerplant; 8. dense visible fumes or concentrations of toxic products sufficient to incapacitate crew or passengers; 9. inability, by use of normal procedures, to shutdown an engine; 10. inability to restart a serviceable engine. (d) An uncommanded thrust/power loss, change or oscillation which is classified as a loss of thrust or power control (LOTC): 1. for a single-engine aircraft; or 2. where it is considered excessive for the application; or where this could affect more than one engine in a multi-engine aircraft particularly in the case of a twin-engine aircraft; or		1. non-containment of components/debris;	
4. thrust-reversing system failing to operate or operating inadvertently 5. inability to control power, thrust or rpm; 6. failure of the engine mount structure; 7. partial or complete loss of a major part of the powerplant; 8. dense visible fumes or concentrations of toxic products sufficient to incapacitate crew or passengers; 9. inability, by use of normal procedures, to shutdown an engine; 10. inability to restart a serviceable engine. (d) An uncommanded thrust/power loss, change or oscillation which is classified as a loss of thrust or power control (LOTC): 1. for a single-engine aircraft; or 2. where it is considered excessive for the application; or where this could affect more than one engine in a multi-engine aircraft particularly in the case of a twin-engine aircraft; or		2. uncontrolled internal or external fire, or hot gas breakout;	
5. inability to control power, thrust or rpm; 6. failure of the engine mount structure; 7. partial or complete loss of a major part of the powerplant; 8. dense visible fumes or concentrations of toxic products sufficient to incapacitate crew or passengers; 9. inability, by use of normal procedures, to shutdown an engine; 10. inability to restart a serviceable engine. (d) An uncommanded thrust/power loss, change or oscillation which is classified as a loss of thrust or power control (LOTC): 1. for a single-engine aircraft; or 2. where it is considered excessive for the application; or where this could affect more than one engine in a multi-engine aircraft particularly in the case of a twin-engine aircraft; or		3. thrust in a direction different from that demanded by the pilot;	;
6. failure of the engine mount structure; 7. partial or complete loss of a major part of the powerplant; 8. dense visible fumes or concentrations of toxic products sufficient to incapacitate crew or passengers; 9. inability, by use of normal procedures, to shutdown an engine; 10. inability to restart a serviceable engine. (d) An uncommanded thrust/power loss, change or oscillation which is classified as a loss of thrust or power control (LOTC): 1. for a single-engine aircraft; or 2. where it is considered excessive for the application; or where this could affect more than one engine in a multi-engine aircraft particularly in the case of a twin-engine aircraft; or		4. thrust-reversing system failing to operate or operating inadvert	tently;
7. partial or complete loss of a major part of the powerplant; 8. dense visible fumes or concentrations of toxic products sufficient to incapacitate crew or passengers; 9. inability, by use of normal procedures, to shutdown an engine; 10. inability to restart a serviceable engine. (d) An uncommanded thrust/power loss, change or oscillation which is classified as a loss of thrust or power control (LOTC): 1. for a single-engine aircraft; or 2. where it is considered excessive for the application; or where this could affect more than one engine in a multi-engine aircraft particularly in the case of a twin-engine aircraft; or		5. inability to control power, thrust or rpm;	
8. dense visible fumes or concentrations of toxic products sufficient to incapacitate crew or passengers; 9. inability, by use of normal procedures, to shutdown an engine; 10. inability to restart a serviceable engine. (d) An uncommanded thrust/power loss, change or oscillation which is classified as a loss of thrust or power control (LOTC): 1. for a single-engine aircraft; or 2. where it is considered excessive for the application; or where this could affect more than one engine in a multi-engine aircraft particularly in the case of a twin-engine aircraft; or		6. failure of the engine mount structure;	
incapacitate crew or passengers; 9. inability, by use of normal procedures, to shutdown an engine; 10. inability to restart a serviceable engine. (d) An uncommanded thrust/power loss, change or oscillation which is classified as a loss of thrust or power control (LOTC): 1. for a single-engine aircraft; or 2. where it is considered excessive for the application; or where this could affect more than one engine in a multi-engine aircraft particularly in the case of a twin-engine aircraft; or		7. partial or complete loss of a major part of the powerplant;	
10. inability to restart a serviceable engine. (d) An uncommanded thrust/power loss, change or oscillation which is classified as a loss of thrust or power control (LOTC): 1. for a single-engine aircraft; or 2. where it is considered excessive for the application; or where this could affect more than one engine in a multi-engine aircraft particularly in the case of a twin-engine aircraft; or			nt to
(d) An uncommanded thrust/power loss, change or oscillation which is classified as a loss of thrust or power control (LOTC): 1. for a single-engine aircraft; or 2. where it is considered excessive for the application; or where this could affect more than one engine in a multi-engine aircraft particularly in the case of a twin-engine aircraft; or		9. inability, by use of normal procedures, to shutdown an engine;	
classified as a loss of thrust or power control (LOTC): 1. for a single-engine aircraft; or 2. where it is considered excessive for the application; or where this could affect more than one engine in a multi-engine aircraft particularly in the case of a twin- engine aircraft; or		10. inability to restart a serviceable engine.	
1. for a single-engine aircraft; or 2. where it is considered excessive for the application; or where this could affect more than one engine in a multi-engine aircraft particularly in the case of a twin- engine aircraft; or			ich is
where it is considered excessive for the application; or where this could affect more than one engine in a multi-engine aircraft particularly in the case of a twin- engine aircraft; or		control (LOTC):	
where this could affect more than one engine in a multi-engine aircraft particularly in the case of a twin- engine aircraft; or		1. for a single-engine aircraft; or	
particularly in the case of a twin- engine aircraft; or		2. where it is considered excessive for the application; or	
			rcraft,
4. for a multi-engine aircraft where the same, or similar, engine type is		engine aircraft; or	
used in an application where the		_ · · · · · · · · · · · · · · · · · · ·	/pe is
event would be considered hazardous or critical.		event would be considered hazardous or critical.	
(e) Any defect in a life-controlled part causing its withdrawal before completion of its full life.			re
(f) Defects of common origin which could cause an in-flight shut-down rate so high that there is the possibility			lown
of more than one engine being shut down on the same flight.		of more than one engine being shut down on the same flight.	
(g) An engine limiter or control device failing to operate when required operating inadvertently.			Juired or
(h) Exceedance of engine parameters.		(h) Exceedance of engine parameters.	
(i) FOD resulting in damage.			
Propellers and transmission		<u> </u>	



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			(j) Failure or malfunction of any part of a propeller or powerplant resulting in any one or more of the
			following:
			1. an overspeed of the propeller;
			2. the development of excessive drag;
			3. a thrust in the opposite direction to that commanded by the pilot;
			4. a release of the propeller or any major portion of the propeller;
			5. a failure that results in excessive imbalance;
			6. the unintended movement of the propeller blades below the established minimum in-flight low-pitch
			position;
			7. an inability to feather the propeller;
			8. an inability to change propeller pitch;
			9. an uncommanded change in pitch;
			10. an uncontrollable torque or speed fluctuation;
			11. the release of low-energy parts.
			Rotors and transmission
			(k) Damage or defect of main rotor gearbox/attachment which could lead to in-flight separation of the rotor
			assembly and/or malfunctions of the rotor control.
			(I) Damage to tail rotor, transmission and equivalent systems.
			APUs
			(m) Shut down or failure when the APU is required to be available by operational requirements, e.g. ETOPS,
			MEL.
			(n) Inability to shut down the APU.
			(o) Overspeed.
			(p) Inability to start the APU when needed for operational reasons.
Technology	10	Rate of aerodrome de-	ANNEX I
		icing facilities failure/flight	D. AIR NAVIGATION SERVICES, FACILITIES AND GROUND SERVICES
		Tanut C/ Hight	(ii) Aerodrome and aerodrome facilities
Human	11	Rate of runway	ANNEX I
		incursions/flight	A. AIRCRAFT FLIGHT OPERATIONS
			(i) Operation of the aircraft
			(b) Take-off or landing incidents, including precautionary or forced landings. Incidents such as under-shooting,
			overrunning or running off the side of runways. Take-offs, rejected take-offs, landings or attempted landings



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List of Safety Po	erfor	mance Indicators	DIRECTIVE 2003/42/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 13 June 2003 on occurrence reporting in civil aviation
			on a closed, occupied or incorrect runway. Runway incursions.
			ANNEX II
			(i) Near collision incidents (encompassing specific situations where one aircraft and another aircraft/the
			ground/a vehicle/person or object are perceived to be too close to each other):
			(d) runway incursion where avoiding action was necessary.
Human	12	Rate of taxiway	ANNEX I
		incursions/flight	A. AIRCRAFT FLIGHT OPERATIONS
			(i) Operation of the aircraft
			(b) Take-off or landing incidents, including precautionary or forced landings. Incidents such as under-shooting,
			overrunning or running off the side of runways. Take-offs, rejected take-offs, landings or attempted landings
			on a closed, occupied or incorrect runway. Runway incursions.
			(s) Collision between an aircraft and any other aircraft, vehicle or other ground object.
			(vii) Other occurrences
			(d) Any other occurrence of any type considered to have endangered or which might have endangered the
			aircraft or its occupants on board the aircraft or on the ground.
			10. Aerodrome movement areas obstructed by aircraft, vehicles, animals or foreign objects, resulting in a hazardous or
			potentially hazardous situation.
Human	13	Rate of stall	ANNEX I
		warnings/flight	A. AIRCRAFT FLIGHT OPERATIONS
			(i) Operation of the aircraft
			(x) Operation of any primary warning system associated with manoeuvring the aircraft e.g. configuration
			warning, stall warning (stick shaker), over-speed warning etc. unless:
Human	14	Rate of bank angle	ANNEXI
		alerts/flight	A. AIRCRAFT FLIGHT OPERATIONS
			(i) Operation of the aircraft
			(x) Operation of any primary warning system associated with manoeuvring the aircraft e.g. configuration
			warning, stall warning (stick shaker), over-speed warning etc. unless:
Human	15	Rate of near	ANNEX II



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List of Safety Po	erfor	mance Indicators	DIRECTIVE 2003/42/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 13 June 2003 on occurrence reporting in civil aviation
		CFIT/flight	(i) Near collision incidents (encompassing specific situations where one aircraft and another aircraft/the
			(c) near-controlled flight into terrain (near CFIT);
Human	16	Rate of deviation from	ANNEX I
		glideslope/approach	A. AIRCRAFT FLIGHT OPERATIONS
			(i) Operation of the aircraft
			(h) Unintentional significant deviation from airspeed, intended track or altitude (more than 300 ft) regardless
			of cause.
			Appendix to ANNEX I
			(e) unexpected deviations in lateral or vertical path not caused by pilot input
			ANNEX II
			(ii) Potential for collision or near collision (encompassing specific situations having the potential to be an
			(d) aircraft deviation from applicable air traffic management (ATM) regulation:
			1. aircraft deviation from applicable published ATM procedures;
			2. unauthorised penetration of airspace;
			3. deviation from aircraft ATM-related equipment carriage and operations, as mandated by applicable
			regulation(s).
Human	17	Rate of deviation from	ANNEX I
		localizer/approach	A. AIRCRAFT FLIGHT OPERATIONS
			(i) Operation of the aircraft
			(h) Unintentional significant deviation from airspeed, intended track or altitude (more than 300 ft) regardless
			of cause.
			(f) problems with ground navigational facilities leading to significant navigation errors not associated with
			transitions from inertial navigation mode to radio navigation mode.
Human	18	Rate of level bust at	ANNEX I
		low altitude/flight	A. AIRCRAFT FLIGHT OPERATIONS
			(i) Operation of the aircraft
			(h) Unintentional significant deviation from airspeed, intended track or altitude (more than 300 ft) regardless
			of cause.
			(i) Descent below decision height/altitude or minimum descent height/altitude without the required visual



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List of Safety P	erfor	mance Indicators	DIRECTIVE 2003/42/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 13 June 2003 on occurrence reporting in civil aviation
			reference.
Human	19	Rate of separation	ANNEX I
		minima infringements	A. AIRCRAFT FLIGHT OPERATIONS
		(ROC>7)/flight	(i) Operation of the aircraft
			risk of collision with another aircraft, terrain or other object or an unsafe situation when avoidance action would have been appropriate;
			ANNEX II
			(i) Near collision incidents (encompassing specific situations where one aircraft and another aircraft/the
			ground/a vehicle/person or object are perceived to be too close to each other):
			(a) separation minima infringement;
			5. Separation minima infringement.
Human	20	Rate of airspace	ANNEX II
	infrir	infringements/flight	(ii) Potential for collision or near collision (encompassing specific situations having the potential to be an
			accident or a near collision, if another aircraft is in the vicinity):
			2. unauthorised penetration of airspace;
Human	21	Rate of level	ANNEX I
	busts/flight	busts/flight	A. AIRCRAFT FLIGHT OPERATIONS
		-	(i) Operation of the aircraft
			(h) Unintentional significant deviation from airspeed, intended track or altitude (more than 300 ft) regardless
			of cause.
Human	22	Rate of high speed	ANNEX I
		rejected take- off/attempted take-	A. AIRCRAFT FLIGHT OPERATIONS
off/att			(i) Operation of the aircraft
		(b) Take-off or landing incidents, including precautionary or forced landings. Incidents such as under-shooting,	
		overrunning or running off the side of runways. Take-offs, rejected take-offs, landings or attempted landings	
			on a closed, occupied or incorrect runway. Runway incursions.
			(f) Occurrences close to or above V 1 resulting from or producing a hazardous or potentially hazardous situa-
			tion (e.g. rejected take-off, tail strike, engine-power loss etc.).
Human	23	Rate of continued	ANNEX II
		approach (go around	(c) aircraft deviation from ATC clearance;



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		not conducted) following unstabilised	(d) aircraft deviation from applicable air traffic management (ATM) regulation:
		approach/approach	1. aircraft deviation from applicable published ATM procedures;
			2. unauthorised penetration of airspace;
			deviation from aircraft ATM-related equipment carriage and operations, as mandated by applicable
			regulation(s).
Human	24	Rate of long	ANNEX I
		landings/landing	A. AIRCRAFT FLIGHT OPERATIONS
			(i) Operation of the aircraft
			(b) Take-off or landing incidents, including precautionary or forced landings. Incidents such as under-shooting,
			overrunning or running off the side of runways. Take-offs, rejected take-offs, landings or attempted landings
			on a closed, occupied or incorrect runway. Runway incursions.
Human	25	Rate of excessive	ANNEX I
		approach speed event/approach	B. AIRCRAFT TECHNICAL
		event/approach	(ii) Systems
			(iii) Propulsion (including engines, propellers and rotor systems) and auxiliary power units (APUs)
			(o) Overspeed.
			ANNEX II
			(ii) Potential for collision or near collision (encompassing specific situations having the potential to be an
			(c) aircraft deviation from ATC clearance;
			(d) aircraft deviation from applicable air traffic management (ATM) regulation:
			1. aircraft deviation from applicable published ATM procedures;
Organisation	26	Rate of unstable	ANNEX I
		approaches/landing	A. AIRCRAFT FLIGHT OPERATIONS
			(i) Operation of the aircraft
			(b) Take-off or landing incidents, including precautionary or forced landings. Incidents such as under-shooting,
			overrunning or running off the side of runways. Take-offs, rejected take-offs, landings or attempted landings
			on a closed, occupied or incorrect runway. Runway incursions.
Organisation	27	Rate of deep	ANNEX I
		landings/landing	A. AIRCRAFT FLIGHT OPERATIONS
			(i) Operation of the aircraft



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			(b) Take-off or landing incidents, including precautionary or forced landings. Incidents such as under-shooting,
			overrunning or running off the side of runways. Take-offs, rejected take-offs, landings or attempted landings
			on a closed, occupied or incorrect runway. Runway incursions.
Organisation	28	Rate of flight crew	ANNEX I
		failure to deploy	B. AIRCRAFT TECHNICAL
		ground spoilers/landing	(ii) Systems
		, 1, 1 1, 1 1	(o) Asymmetry of flight controls; e.g. flaps, slats, spoilers etc.
			Appendix to ANNEX I
			7. Flight controls
			(a) asymmetry of flaps, slats, spoilers, etc.
Organisation	29	Rate of delayed brake	Appendix to ANNEX I
		application/landing	7. Flight controls
			(b) limitation of movement, stiffness or poor or delayed response in the operation of primary flight control systems
Organisation	30	Rate of delayed	Appendix to ANNEX I
		application of thrust reversers/landing	7. Flight controls
		Teversers/landing	(b) limitation of movement, stiffness or poor or delayed response in the operation of primary flight control systems
Organisation	31	Rate of level-	ANNEX I
		busts/flight	A. AIRCRAFT FLIGHT OPERATIONS
			(i) Operation of the aircraft
			(h) Unintentional significant deviation from airspeed, intended track or altitude (more than 300 ft) regardless
			of cause.
			(i) Descent below decision height/altitude or minimum descent height/altitude without the required visual
			reference.
Organisation	32	Rate of navigation	ANNEX II
		errors which result in a loss of separation with another	(i) Near collision incidents (encompassing specific situations where one aircraft and another aircraft/the
		aircraft/flight	(a) separation minima infringement;
Organisation	33	Rate of incorrect flight	ANNEX I
		crew response to genuine TCAS RA	A. AIRCRAFT FLIGHT OPERATIONS
		warnings/warning	(i) Operation of the aircraft
		_	(t) Inadvertent and/or incorrect operation of any controls.
Organisation	34	Rate of loss of	ANNEX II



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		separation events/flight	(i) Near collision incidents (encompassing specific situations where one aircraft and another aircraft/the
			(a) separation minima infringement;
Organisation	35	Rate of STCA	ANNEX II
		warnings/flight	(ii) Potential for collision or near collision (encompassing specific situations having the potential to be an
			accident or a near collision, if another aircraft is in the vicinity):
Organisation	36	Rate of EGPWS	ANNEX I
		events/flight	A. AIRCRAFT FLIGHT OPERATIONS
			(i) Operation of the aircraft
			(z) GPWS/TAWS 'alert' when any difficulty or hazard arises or might have arisen as a result of crew response
			to the 'alert'.
Organisation	37	Rate of incorrect flight	ANNEX I
		crew response to	A. AIRCRAFT FLIGHT OPERATIONS
		genuine EGPWS warning	(i) Operation of the aircraft
			(z) GPWS/TAWS 'alert' when any difficulty or hazard arises or might have arisen as a result of crew response
			to the 'alert'.
Organisation	38	Rate of navigational	ANNEX II
		errors which result in a loss of separation with terrain/flight	(i) Near collision incidents (encompassing specific situations where one aircraft and another aircraft/the
			(a) separation minima infringement;
Organisation	39	Rate of MSAW	ANNEX I
		warnings/flight	A. AIRCRAFT FLIGHT OPERATIONS
			(i) Operation of the aircraft
			(h) Unintentional significant deviation from airspeed, intended track or altitude (more than 300 ft) regardless
			of cause.
			(i) Descent below decision height/altitude or minimum descent height/altitude without the required visual
			reference.
Organisation	40	Rate of misuse of	ANNEX I
		automation	A. AIRCRAFT FLIGHT OPERATIONS
		events/flight	(i) Operation of the aircraft
			(t) Inadvertent and/or incorrect operation of any controls.
Organisation	41	Rate of near-stall	ANNEX I
		events/flight	A. AIRCRAFT FLIGHT OPERATIONS
			(i) Operation of the aircraft



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			(x) Operation of any primary warning system associated with manoeuvring the aircraft e.g. configuration
			warning, stall warning (stick shaker), over-speed warning etc. unless:
Organisation	42	Rate of high bank	ANNEX I
		angle events/flight	A. AIRCRAFT FLIGHT OPERATIONS
			(i) Operation of the aircraft
			(x) Operation of any primary warning system associated with manoeuvring the aircraft e.g. configuration
			warning, stall warning (stick shaker), over-speed warning etc. unless:
Organisation	43	Rate of runway	ANNEX I
C · Barnoution		incursion events/flight	A. AIRCRAFT FLIGHT OPERATIONS
		_	(i) Operation of the aircraft
			(b) Take-off or landing incidents, including precautionary or forced landings. Incidents such as under-shooting,
			overrunning or running off the side of runways. Take-offs, rejected take-offs, landings or attempted landings
			on a closed, occupied or incorrect runway. Runway incursions.
			ANNEX II
			(i) Near collision incidents (encompassing specific situations where one aircraft and another aircraft/the
			(d) runway incursion where avoiding action was necessary.
Organisation	44	Rate of ground	ANNEX I
	movement		A. AIRCRAFT FLIGHT OPERATIONS
	errors/flight	(i) Operation of the aircraft	
		(b) Take-off or landing incidents, including precautionary or forced landings. Incidents such as under-shooting,	
		overrunning or running off the side of runways. Take-offs, rejected take-offs, landings or attempted landings	
		•	on a closed, occupied or incorrect runway. Runway incursions.
			(s) Collision between an aircraft and any other aircraft, vehicle or other ground object.
		•	(vii) Other occurrences
		•	(d) Any other occurrence of any type considered to have endangered or which might have endangered the
			aircraft or its occupants on board the aircraft or on the ground.
System of	45	System combined	ANNEX I
Organisations	7.5	runway incursion rate	



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List of Safety Po	erfor	mance Indicators	DIRECTIVE 2003/42/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 13 June 2003 on occurrence reporting in civil aviation
			A. AIRCRAFT FLIGHT OPERATIONS
			(i) Operation of the aircraft
			(b) Take-off or landing incidents, including precautionary or forced landings. Incidents such as under-shooting,
			overrunning or running off the side of runways. Take-offs, rejected take-offs, landings or attempted landings
			on a closed, occupied or incorrect runway. Runway incursions.
System of Organisations	46	System combined taxiway incursion rate	ANNEX I
			A. AIRCRAFT FLIGHT OPERATIONS
			(i) Operation of the aircraft
			(b) Take-off or landing incidents, including precautionary or forced landings. Incidents such as under-shooting,
			overrunning or running off the side of runways. Take-offs, rejected take-offs, landings or attempted landings
			on a closed, occupied or incorrect runway. Runway incursions.
			(s) Collision between an aircraft and any other aircraft, vehicle or other ground object.
			(vii) Other occurrences
			(d) Any other occurrence of any type considered to have endangered or which might have endangered the
			aircraft or its occupants on board the aircraft or on the ground.
System of Organisations	47	System combined airprox rate	extension to 2003/42/EC
System of Organisations	48	Operator combined erroneous weather prediction rate	extension to 2003/42/EC
System of Organisations	49	System combined bird strike rate	extension to 2003/42/EC
System of Organisations	50	Total number of formal safety related meetings involving at least to different type of organisations (e.g. an aerodrome and ANSP) per year	extension to 2003/42/EC



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List of Safety Performance Indicators			DIRECTIVE 2003/42/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 13 June 2003 on occurrence reporting in civil aviation
System of Organisations	51	Total number of formal meetings of network of analysts to discuss safety performance measurement	extension to 2003/42/EC
System of Organisations	52	The safety impact of each significant airport infrastructural change is assessed and deemed acceptable before the actual introduction of the change	extension to 2003/42/EC
System of Organisations	53	The actual safety impact of each significant airport infrastructural change is evaluated at most after 3 years of implementation of the change	extension to 2003/42/EC
System of Organisations	54	The safety impact of each significant aircraft modification is assessed and deemed acceptable before the actual introduction of the modification	extension to 2003/42/EC
System of Organisations	55	The actual safety impact of each significant aircraft modification is evaluated at most after 3 years of implementation of the modification	extension to 2003/42/EC
System of Organisations	56	The safety impact of each significant ATM provision modification is assessed and deemed acceptable before the actual introduction of the modification	extension to 2003/42/EC



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List of Safety Performance Indicators		mance Indicators	DIRECTIVE 2003/42/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 13 June 2003 on occurrence reporting in civil aviation
System of Organisations	57	The actual safety impact of each significant ATM provision modification is evaluated at most after 3 years of implementation of the modification	extension to 2003/42/EC
System of Organisations	58	The safety impact of an aircraft flying under an outdated certification scheme is assessed after each significant change in certification rules	extension to 2003/42/EC
System of Organisations	59	A proper means to identify future risks is set-up and altered when deemed necessary	extension to 2003/42/EC
System of Organisations	60	Future risk are identified on a regular basis (at least each year new risks should be identified) using a dedicated means to do so	extension to 2003/42/EC
System of Organisations	61	A common risk classification framework is used by CAAs and industry (using the same criteria for likelihood and severity of events)	extension to 2003/42/EC
System of Organisations	62	The number of organisations that have fully implemented a Safety Management System before the final transitional dates allowed	extension to 2003/42/EC



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List of Safety Performance Indicators		mance Indicators	DIRECTIVE 2003/42/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 13 June 2003 on occurrence reporting in civil aviation
System of Organisations	63	The average level of regulatory compliance of states (for example using ICAO USOAP CMA 8 or EASA audits) should be measured every three years and should increase every three years	extension to 2003/42/EC



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Appendix E ICAO USOAP Program and Continuous Monitoring Approach and EASA Standardisation

Appendix E.1 ICAO USOAP Program and Continuous Monitoring
Approach

ICAO USOAP Program and CMA overview

USOAP CMA background

The ICAO Universal Safety Oversight Audit Programme (USOAP) was launched on 1 January 1999, pursuant to a resolution A32-11, which was adopted at the 32nd Session of the ICAO Assembly, in response to widespread concerns about the adequacy of aviation safety oversight around the world.

In recognition of the success achieved by USOAP, the 33rd Session of the Assembly (22 September – 5 October 2001) adopted Assembly Resolution A33-8, which expanded the USOAP to audits of Annex 11 — Air Traffic Services, Annex 14 — Aerodromes, and other safety-related areas such as Annex 13 — Aircraft Accident and Incident Investigation.

In September 2007, the 36th Session of the Assembly adopted Resolution A36-4 directing the Council to examine different options for the continuation of the USOAP beyond 2010, including the feasibility of applying a new approach based on the concept of continuous monitoring.

Pursuant to this resolution, the Council directed the Secretariat to look at the future of the programme beyond 2010, with a view to incorporating the analysis of safety risk factors, adopting a more proactive approach, making a more effective and efficient use of ICAO resources, and increasing the role of other ICAO bureaux and the regional offices (ROs). To this effect, in July 2008 the Secretariat established a study group to examine the feasibility of adopting a CMA. Based on a comparative analysis of the benefits, constraints and implementation costs, the study group resolved that, in order to ensure efficiency, long-term sustainability and cost-effectiveness, preference should be given to the application of a CMA for the continuation of USOAP beyond 2010.

The 37th Session of the Assembly (September – October 2010) adopted Resolution A37-5, affirming that the evolution of USOAP to the CMA should be a top priority for ICAO to ensure that information on the safety performance of Member States is provided to other Member States and to the travelling public on an ongoing basis.

Critical elements of a safety oversight system

ICAO specifies eight critical elements of the safety oversight system that cover the entire area of operations in civil aviation [4,5]. The level of effective implementation of the critical elements is an indication of a State's capability for safety oversight. These are:

1. **Primary aviation legislation** (aviation law consistent with the environment and complexity of the State's aviation activity and compliant with the requirements contained in the Convention on International Civil Aviation).



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- Specific operating regulations (adequate regulations providing for standardized operational procedures, equipment and infrastructures (including safety management and training systems), in conformance with the Standards and Recommended Practices (SARPs) contained in the Annexes to the Convention on International Civil Aviation).
- 3. **State civil aviation system and safety oversight functions** (Civil Aviation Authority (CAA), supported by the appropriate and adequate technical and non-technical staff and provided with adequate financial resources).
- 4. **Technical personnel qualifications and training** (minimum knowledge and experience requirements for the technical personnel performing safety oversight functions and the provision of appropriate training).
- 5. **Technical guidance, tools and provision of safety-critical information** (technical guidance (including processes and procedures), tools (including facilities and equipment) and safety-critical information, to the technical personnel to enable them to perform their safety oversight functions in accordance with established requirements and in a standardized manner).
- 6. Licensing, certification, authorization and/or approval obligations (processes and procedures to ensure that personnel and organizations performing an aviation activity meet the established requirements before they are allowed to exercise the privileges of a licence, certificate, authorization and/or approval to conduct the relevant aviation activity).
- 7. **Surveillance obligations** (processes, such as inspections and audits, to proactively ensure that aviation licence, certificate, authorization and/or approval holders continue to meet the established requirements and function at the level of competency and safety).
- 8. **Resolution of safety concerns** (processes and procedures to resolve identified deficiencies impacting aviation safety, which may have been residing in the aviation system and have been detected by the regulatory authority).

Audit areas

The following eight audit areas have been identified in the USOAP:

- 1) primary aviation legislation and civil aviation regulations;
- 2) civil aviation organization;
- 3) personnel licensing and training;
- 4) aircraft operations;
- 5) airworthiness of aircraft;
- 6) aircraft accident and incident investigation;
- 7) air navigation services; and
- 8) aerodromes and ground aids.

The Continuous Monitoring Approach (CMA) concept

The objective of USOAP CMA is:

to promote global aviation safety through continuous monitoring of the Member States' safety oversight capabilities.

The USOAP CMA provides a mechanism for ICAO to collect safety information from Member States and other stakeholders and to analyse this information using a risk-based approach to identify and prioritize appropriate activities to be carried out by ICAO.

USOAP CMA is designed to monitor the safety oversight capabilities and safety performance of States on a continuous basis.



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The CMA online framework provides ICAO. Member States and other authorized users with a suite of web-integrated applications that allow continuous monitoring and reporting of safety-related information and documentation received from different sources.

The Online Framework consists of the following:

- State Aviation Activity Questionnaires (SAAQs);
- Compliance Checklists (CCs);
- Protocol Questions (PQs);
- Mandatory Information Requests (MIRs);
- Findings and Recommendations (F&Rs);
- Significant Safety Concerns (SSCs);
- Corrective Action Plans (CAPs).

The following cycle describes the processes of collecting and analysing data under the CMA, and how this information is then used to prioritise strategies. The CMA captures vast amounts of data from ICAO member States and other stakeholders. The cycle consists of four major components [5]:

- a) collection of safety information;
- b) determination of State safety risk profile;
- c) prioritization and conduct of USOAP CMA activities; and
- d) update of the Lack of Effective Implementation (LEI) and the status of Significant Safety Concerns (SSCs).

The first component is the process of gathering information about safety.

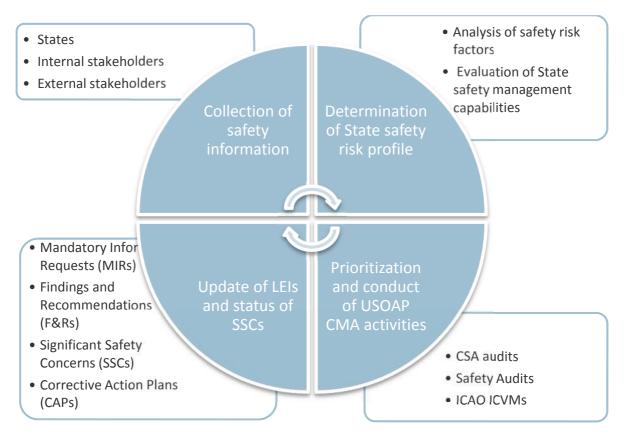
The information comes from three sources: Member States, internal and external stakeholders. Member States provide the primary source of safety information by completing, submitting and updating State Aviation Activity Questionnaire (SAAQ), Compliance Checklists (CCs - through the EFOD system) and USOAP CMA Protocol Questions (PQs).

Internal stakeholders (ICAO Secretariat, bureaux, sections and offices) provide information to the USOAP CMA that are collected and shared internally through ICAO's Integrated Safety Trend Analysis and Reporting System (ISTARS).

The third source of information is confidential safety information based on agreements with external stakeholders including national, regional, supranational and international organizations recognized by ICAO.



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The USOAP CMA components

The second component is the process of determination of State safety risk profile.

The State safety risk profile is based on various safety risk indicators that identify or highlight specific information related to a State that needs to be considered in identifying and prioritizing USOAP CMA activities.

These safety risk indicators include: Lack of Effective Implementation (LEI), Significant Safety Concern (SSC), the level of aviation activities in the State related to each audited area, the projected growth of aviation activities in the State, the level of acceptability of the State's Corrective Action Plan (CAP) and its implementation progress and progress in implementing a Safety management system (SMS) and State safety programme (SSP). The State safety risk profile is monitored on an ongoing basis at ICAO Headquarters.

Where the CMA process indicates that a State is not making progress in resolving identified Findings and Recommendations (F&Rs) and/or SSCs, or if the collected information indicates that the safety oversight system in a State has deteriorated, ICAO may take actions such as: increase the monitoring of the State, provide or facilitate assistance, consider financial or technical aid, reassess or monitor more closely existing technical assistance projects.

Next component is the process of prioritization and conduct of USOAP CMA activities

This process covers activities conducted by ICAO Monitoring and Oversight Section (CMO) and ICAO Regional office (ICAO ROs) to identify deficiencies in a State and to assess and elaborate Finding and Recommendation (F&Rs) and Significant



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Safety Concerns (SSCs). These are: Comprehensive Systems Approach (CSA) Audits, Safety Audits and ICAO Coordinated Validation Missions (ICVMs).

The objective of a CSA Audit is to determine a State's capability for safety oversight by assessing the effective implementation of the eight CEs of the safety oversight system and the status of the State's implementation of all safety-related ICAO SARPs, associated procedures, guidance material and best safety practices. The objective of a Safety Audit is to an audit of its current safety oversight system.

The objective of an ICVM is to assess and validate the status of corrective actions or mitigating measures taken by a State to address previously identified F&Rs, including SSCs. ICVMs also include on-site guidance provided to the State in resolving remaining deficiencies.

The final component is the process of update of Lack of Effective Implementations (LEIs) and status of Significant Safety Concerns (SSCs).

Estimation of collected safety information enables ICAO to continuously update the Lack of Effective Implementation (LEI) of the safety oversight capability for each State. The LEI is based on the number of applicable non-satisfactory Protocol Questions (PQs). The LEI for each State may be updated based on the information received through Mandatory Information Requests (MIRs) and Corrective Action Plans (CAPs) indicating progress made in resolving Findings and Recommendations (F&Rs) and Significant Safety Concerns (SSCs).

If an F&R is considered to be an immediate safety risk to international civil aviation, the State will be informed of the identification of an SSC and requested to take immediate mitigating or corrective actions. If appropriate evidence is not provided by the State that such actions have been taken within a specified timeframe, all Member States will be notified of the SSC through the CMA online framework.

State obligations under the USOAP CMA

Member States shall sign USOAP CMA Memorandum of Understanding (MOU) with ICAO to confirm their full support of the USOAP CMA process and to commit to actively participating in all USOAP CMA activities, including the provision of information through the CMA online framework. Member States should secure adequate resources to meet all the conditions of the MoU.

Each State is responsible for identifying one or more qualified National Continuous Monitoring Coordinators (NCMCs) to act, on an on-going basis, as primary point(s) of contact for all USOAP CMA processes and activities.

The NCMC is responsible for maintaining and updating the information to be provided by the State to the CMO Section on an on-going basis, including:

- SAAQ,
- CCs,
- State responses to PQs,
- State responses to MIRs,



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- CAPs to resolve F&Rs,
- Mitigating measures taken by the State in response to SSCs,
- The latest information regarding the SSP, and
- Other relevant safety information, as requested by ICAO.

The NCMC shall coordinate the completion and ongoing update of the CCs in order to provide the CMO with information regarding the implementation of provisions of the relevant Annexes to the Convention.

Perspectives of the use of USOAP CMA

The effective SSP implementation is one of the near-term ICAO Global Aviation Safety Plan (GASP) [7] objectives. It is a gradual process requiring time, depending on complexity of air transportation and applicable to States with mature safety oversight systems. Since 14 November 2013 the overarching safety management provisions of the Annexes have been transferred into a new **Annex 19**[2]. It is supported by guidance of Safety Management Manual (Doc 9859) which 3rd edition of 2013 was substantially enhanced. The four components of the SSP were elevated to the status of ICAO Standard to match the SMS framework. The SSP implementation timeline was organised into four phases [6]:

- Phase 1 (12 months) identification of SSP place holder, executives, establishing SSP teams, perform gap analysis, develop implementation plan, establish coordination mechanism, develop documentation.
- Phase 2 (12 months) establish a legislative framework, document safety management responsibilities, define
 State safety policy and objectives, establish accident investigation process, basic enforcement, provide for safety oversight, promote SMS education.
- Phase 3 (24 months) promulgate enforcement policy, develop harmonised legislation requiring SMS, establish safety data collection and exchange system, establish State SPIs and target levels.
- Phase 4 (24 months) review and agree upon service provider's SPIs, incorporate SMS and SPIs into routine surveillance programme, implement voluntary/confidential safety reporting, establish lower consequence indicators, promote safety information exchange among organisations across ICAO, prioritise inspections based on the analysis of safety risk, establish internal review mechanism

Starting May 14th, 2014, ICAO is going to monitor Member States' implementation of SSP through the Universal Safety Oversight Audit Programme (USOAP) [2]. The necessary input is supposed to be acquired through the adjusted USOAP State Aviation Activity Questionnaire (SAAQ) grouped in alignment with phased-approach implementation and Protocol Questionnaires (PQs) as appropriate [10].

The Memorandum of Cooperation between EU and ICAO of 2010 [14] provided a framework for enhanced cooperation including coordination of respective audits and inspection programmes avoiding duplication of efforts.

The implementation of the USOAP CMA provides ICAO effective system of continuous monitoring and management in the field of civil aviation. The system allows carrying out both corrective actions and improvement actions.



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Appendix E.2 EASA Standardisation

Legal bases of EASA standardisation

In accordance with the will of Member States of the European Community and having regard to the Treaty establishing the European Community, in July 2002, the European Parliament and the Council of the European Union introduced Regulation (EC) No 1592/2002 on common rules in the field of civil aviation and establishing a European Aviation Safety Agency, called Basic Regulation. In this way, the process of creating the common law was launched. Further regulations expand the scope of the common law and EASA competences (see Table 1).

Table 1: The process of extending the scope of the common rules and EASA competences

Regulation	Competences
Regulation (EC) No 1592/2002	Initial Basic Regulation: 1. Initial and continuing airworthiness 2. Environmental compatibility
Regulation (EC) No 216/2008 [24]	Basic Regulation: (repealing Council Directive 91/670/EEC, Regulation (EC) No 1592/2002 and Directive 2004/36/EC) First extension: 1. Flight Crew Licencing (FCL) 2. Operation of Aircraft (OPS) 3. Safety of foreign operators
Regulation (EC) No 1108/2009 [51]	Second extension: 1. Air Traffic Management (ATM) 2. Air Navigations Services (ANS) 3. Aerodromes

The principal objective of this Regulation [24] is **to establish and maintain a high uniform level of civil aviation safety in Europe**. There are also six additional objectives of this Regulation:

- a) to ensure a high uniform level of environmental protection;
- b) to facilitate the free movement of goods, persons and services;
- c) to promote cost-efficiency in the regulatory and certification processes and to avoid duplication at national and European level;
- d) to assist Member States in fulfilling their obligations under the Chicago Convention, by providing a
 basis for a common interpretation and uniform implementation of its provisions, and by ensuring that
 its provisions are duly taken into account in this Regulation and in the rules drawn up for its
 implementation;
- e) to promote Community views regarding civil aviation safety standards and rules throughout the world by establishing appropriate cooperation with third countries and international organisations;
- f) to provide a level playing field for all actors in the internal aviation market.



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To achieve these objectives, the European Union took the following means:

- 1) the preparation, adoption and uniform application of all necessary acts;
- 2) the recognition, without additional requirements, of certificates, licences, approvals or other documents granted to products, personnel and organisations in accordance with the Regulation and its implementing rules;
- 3) the establishment of an independent European Aviation Safety Agency (EASA);
- 4) the uniform implementation of all necessary acts by the national aviation authorities and the Agency within their respective areas of responsibility.

Article 10 of the Basic Regulation [24] specifies the requirements in the area of oversight and enforcement. The Member States, the Commission and EASA cooperate with a view to ensuring that any product, person or organisation subject to the Basic Regulation complies with its provisions and with its implementing rules.

Member States, in addition to their oversight of certificates that they have issued, conduct investigations, including ramp inspections, and take any measure, including the grounding of aircraft, to prevent the continuation of an infringement.

EASA conduct investigations in accordance with Article 24 and Article 55. The tasks of EASA include:

- Standardisation inspections, in order to monitor the application by national competent authorities of the Basic Regulation and of its implementing rules, and report to the Commission;
- Investigations of undertakings to monitor the application of the Basic Regulation and its implementing. All necessary investigations of undertakings EASA may conduct itself or assign to national aviation authorities or qualified entities. These investigations are carried out in compliance with the legal provisions of the Member States in which they are to be undertaken.
- Assessment of the impact of the implementation of the Basic Regulation and its implementing rules, having regard to its objectives.

The working methods of EASA for conducting the above tasks lay down implementing rules. Table 2 contains a list of implementing rules.

Table 2: List of Implementing rules in area of the oversight and enforcement the Basic Regulation

Implementing Regulation	Subject
Commission Regulation (EC) No 736/2006	Working methods of the European Aviation Safety Agency for conducting standardisation inspections
Commission Regulation (EC) No 859/2008	Safety of third-country aircraft using Community airports
Commission Directive 2008/49/EC	Criteria for the conduct of ramp inspections on aircraft using Community airports
Commission Regulation (EU) No 691/2010	Performance scheme for air navigation services and network functions, common requirements for the provision of air navigation services
Commission Regulation (EU) No 805/2011	Detailed rules for air traffic controllers' licences and certain certificates
Commission Implementing Regulation (EU) No 1034/2011	Administrative procedures for the safety oversight of air traffic management and air navigation services



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Implementing Regulation	Subject
Commission Implementing Regulation (EU) No 1035/2011	Common requirements for the provision of air navigation services
Commission Regulation (EU) No 1178/2011	Technical requirements and administrative procedures related to civil aviation aircrew
Commission Implementing Regulation (EU) No 90/2012	Amending Regulation (EC) No 736/2006 on working methods of the European Aviation Safety Agency for conducting standardisation inspections
Commission Implementing Regulation (EU) No 923/2012	Common rules of the air and operational provisions regarding services and procedures in air navigation
Commission Regulation (EU) No 965/2012	Technical requirements and administrative procedures related to air operations
Commission Implementing Regulation (EU) No 628/2013	Working methods of the European Aviation Safety Agency for conducting standardisation inspections and for monitoring the application of the rules of Regulation (EC) No 216/2008 of the European Parliament (repealing Commission Regulation (EC) No 736/2006)

Process of standardisation

Process of standardisation is a process monitoring the application by competent authorities of the Member States of common rules in the field of civil aviation. Standardisation does not include the rulemaking process, but standardisation is directly associated with the rulemaking process. The legal basis for this activity stems from Art. 24(1) of the Basic Regulation.

The EASA Approvals and Standardisation Directorate [52] is responsible for ensuring that the EU aviation safety legislation is properly, uniformly and consistently applied Articles 24 (Monitoring the application of the rules), 54 (Inspections of Member States) and 55 (Investigation of undertakings) of the Basic Regulation. This role covers the inspections for standardisation of the National Aviation Authorities (NAAs).

In addition, inspections to NAAs are also performed by the Directorate in the context of the accreditation process for allocation of certification tasks.

The Standardisation department monitors the application by competent authorities of the requirements set in Basic Regulation and its Implementing Rules, as well as their uniform implementation. Such monitoring activity is continuous and risk-based, on the basis of the information available to the Agency.

It entails assessing the competent authorities' ability to discharge their safety oversight responsibilities, conducting inspections as necessary, as well as the follow-up of findings stemming from inspections, in order to ensure that appropriate corrections and corrective actions are timely implemented.

The organizational structure of the Standardization Department is shown in Figure below.



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Organisation chart of EASA Standardisation Department

The primary objectives for EASA Standardisation Department [52] are to:

- Monitor the application of the rules by competent authorities (CAs);
- Conduct standardisation inspections of CAs;
- Contribute to the assessment of the impact of the implementation by CAs of Basic Regulation and its implementing rules;
- Perform international standardisation activities in line with Bilateral Aviation Safety Agreements or Working Arrangements;
- Ensure effective communication with CAs and facilitate exchange of data;
- Provide technical expertise assistance to the European Commission;
- Contribute to the certification and approval activities of the Agency by performing accreditation audits required by the MB Decision 01/2011 (Adopting the guidelines for the allocation of certification tasks to National Aviation Authorities and Qualified Entities), to both CAs and QEs.

In accordance with the provisions of Art. 24(5) of the Basic Regulation, the working methods of EASA for monitoring the application of the rules and conducting standardisation inspections are defined in Commission Implementing Regulation (EU) No 628/2013 [15].

Member States designate a National Standardisation Coordinator, acting as their primary point of contact for all standardisation activities and in particular to coordinate the exchange of information provided. The National Standardisation Coordinator is responsible for:



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 Maintaining and updating the information provided to EASA on an on-going basis, corrections and corrective action plans and evidence of implementation of the agreed corrective actions

 Assisting EASA at all stages of an inspection and ensuring that the inspection team is accompanied throughout the on-site inspections.

This regulation introduces a fundamental shift from simple "inspecting" to full "monitoring", as EASA now puts in place a continuous and risk-based monitoring system.

This system (also called Continuous Monitoring Approach or CMA) is a cyclical approach that entails 5 components:

1. Collect information from Member States' Competent Authorities, ICAO, the EC and other sources

Competent authorities of Member States provide EASA with all necessary information relevant to their safety oversight, addressing all the critical elements of their safety oversight system, including the undertakings or associations of undertakings under their oversight.

The information are provided in a form and a manner specified by the Agency, taking into account the information that has been made available to ICAO. In general web-based interfaces are used.

EASA may also request ad-hoc information from the competent authorities of Member States. A National Standardization Coordinator is responsible for the provision of information to EASA from the Member States.

2. Analyse the Authorities' ability to discharge their safety oversight responsibilities

For the assessment EASA establishes, develops and maintains a single model taking into account at least the following elements:

- a) The size and complexity of the aviation industry;
- b) Serious incidents, accidents, fatal accidents and related fatalities;
- c) The results of ramp inspections;
- d) The results of previous inspections;
- e) The ability of the competent authorities to implement effectively corrections and corrective actions;
- f) The result of audits carried out under international conventions or State safety assessment programmes;



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The collection and analysis of data and information provided by Member States, ICAO, the **Commission or other relevant** sources. The follow-up and closure of The assessment of the findings of non-conformity competent authority's ability stemming from the to discharge its safety inspections. oversight responsibilities. The conduct of such The prioritisation, planning and determination of the inspections, including the scope of inspections. related reporting.

Continuous monitoring process

The outcome of the model and the input data and results of the assessment are made available to the national standardisation coordinator of the Member State concerned.

3. Prioritise/plan/define the scope of inspections accordingly

EASA adapts the inspection programme in the light of its continuous monitoring, reflecting both improvements and deteriorations in safety performance. EASA takes appropriate action when there is evidence that the safety performance deteriorates.

EASA carries out inspections addressing each domain defined in Basic Regulation: airworthiness and environmental protection, air crew, air operations, ramp inspections, aerodromes, ATM/ANS and air traffic controllers.

4. Perform inspections where appropriate, when appropriate, as in-depth as appropriate

EASA performs three types of inspection:

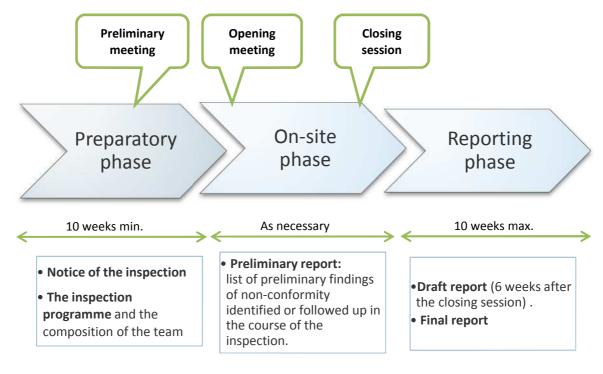
- a) Comprehensive inspections, for the purpose of inspecting one or more domains (regular, periodic);
- b) Focused inspections, for the purpose of inspecting specific areas within one or more domains, and/or for the purpose of assessing the implementation status of agreed corrections and corrective actions;
- c) Ad hoc inspections, for the purpose of investigating specific concerns arising from continuous monitoring or upon request from the Commission.



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Notwithstanding the inspections, EASA may identify off-site findings when it has collected sufficient evidence of non-conformity.

Inspections are carried out by teams set up by EASA. Each team has a team leader and one team member as a minimum. In all cases, EASA ensures the size of the teams remains commensurate to the scope.



EASA Inspection process

Comprehensive and focused inspections consist of the following phases:

- a) A preparatory phase, lasting a minimum of 10 weeks prior to the inspection.
 - During the preparatory phase, EASA gives notice of the inspection to the competent authority, including the intended type, domain(s) and areas for inspection.
 - Then it collects the necessary information (in particular from continuous monitoring) for the preparation of the inspection, define the scope, the extent and the programme of the inspection, including the inspection of undertakings or association of undertakings.
 - EASA determines the size and the composition of the inspection team.
 - EASA presents the inspection programme and the composition of the team to the competent authority at least 2 weeks before the on-site phase.
- b) An on-site phase.
 - During the on-site phase of an inspection, EASA organises an opening meeting with the National Standardisation Coordinator and the competent authority inspected.



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- Then, during the on-site inspection, the inspection team inspects the main offices, regional offices of the competent authority and undertakings or associations of undertakings under the oversight of the competent authority as part of the inspection of this competent authority.
- The inspection team carries out interviews with the staff and examines legislation, procedures, certificates, records, data and any other relevant material.
- At a closing session, the inspection team presents to the competent authority inspected a list of preliminary findings of non-conformity identified or followed up in the course of the inspection.
- c) A reporting phase, lasting a maximum of 10 weeks following the end of the on-site phase.
 - During the reporting phase of an inspection, EASA reviews the preliminary findings of nonconformity identified or followed up during the inspection, classifies them and establishes on this
 basis a draft report addressed to the competent authority inspected (within 6 weeks after the
 closing session of the on-site phase).
 - EASA issues a final report on the basis of the draft report (within 10 weeks after the closing session), reflecting the comments of the competent authority inspected, if any.
 - EASA may adapt the description of the finding of non-conformity, its legal basis, its classification
 or its status as appropriate to take into account the comments as well as the corrections or
 corrective actions submitted during the reporting phase.

5. Follow-up and closure of any finding stemming from the inspections.

All findings of non-conformity identified by EASA, in the framework of the inspections are classified and reported by EASA, whether they pertain to administrative requirements or to technical requirements, in one of the following classes:

- a) Class C: non-conformity with the applicable requirements, raising mainly standardisation concerns;
- b) Class D: non-conformity with the applicable requirements, raising standardisation concerns and safety concerns if not timely corrected;
- c) Class G: immediate safety concern.

When an immediate safety concern has been notified by EASA, EASA requests the competent authority to take adequate corrective actions, including immediate corrections. The competent authority applies effective corrections to remove the finding and provides EASA with evidence thereof.

When the corrections do not satisfy EASA, EASA makes recommendations to the Commission, including where necessary a request with regard to the mutual recognition of the certificate(s) issued by the competent authority. EASA also informs the competent authorities of the Member States immediately.

For all findings of non-conformity classified as Class D and G, the competent authority shall propose a correction and a corrective action no later than four weeks after receipt of the notification from EASA, for the findings of non-conformity classified as Class C - no later than 10 weeks after receipt of the notification from EASA. The competent authority also reports to EASA on the completion of corrective actions and provides evidence thereof.



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EASA evaluates the corrections and the corrective actions submitted by the competent authority, agrees with or rejects the corrections and/or corrective actions, monitors the satisfactory implementation of corrective actions and closes the findings of non-conformity once satisfied with the completion of the corrective actions and the evidence provided, records the closure of the findings of non-conformity and informs the competent authority accordingly.

EASA has to perform standardisation inspections in all EU Member States, on the basis of the provisions of the Basic Regulation, as well as in Iceland, Liechtenstein, Norway and Switzerland, on the basis of bilateral or multilateral agreements signed between the EU and such States, which inter alia transpose the provisions of the Basic Regulation and its IRs.

Furthermore, EASA is entitled to perform standardisation inspections in several other countries based on specific Working Arrangements (WA) between EASA and the respective State.

In addition to inspections, the EASA Standardisation Department also:

- Performs ad-hoc and follow-up inspections where required;
- Raises off-site findings when it has collected sufficient evidence of non-conformity;
- Organises Standardisation meetings, workshops and webinars with CA's;
- Manages a web-based communication forum exchanging information with CA's (SINAPSE) and a webbased data collection tool (SIS) to receive and analyse relevant data;
- Participates in ICAO Universal Safety Oversight Audit Programme (USOAP) audits;
- Conducts Accreditation audits where CA's and Qualified Entities perform certain oversight tasks on behalf of the Agency;
- Provides technical experts to European Commission missions;
- Establishes the Agency's annual report on standardisation activities and regular reporting to the European Commission.

Coordination of ICAO USOAP CMA and EASA Standardisation

The ICAO USOAP CMA, described in Section 4, and EASA Standardisation, described in this section, have a similar approach to process safety monitoring. Both approaches assume the process of continuous monitoring and the monitoring based on safety performance. However, the transition from the monitoring compliance with rules to the continuous monitoring based on safety performance is a complex process.

A step in the right direction is the signing of Memorandum of Cooperation [53] between the European Union and the International Civil Aviation Organization providing a framework for enhanced cooperation which took place on 27 September 2010 during the course of the 37th Assembly of the International Civil Aviation Organization in Montréal. This Memorandum establishes cooperation between EU and ICAO in the areas: aviation safety, aviation security, air traffic management and environmental protection. The scope of cooperation in the area of aviation safety is specified in Annex 1 to the memorandum.

Overall scope of the cooperation covers:



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- conducting regular dialogue on safety matters of mutual interest,
- achieving transparency through the regular exchange of safety-relevant information and data and by providing mutual access to databases,
- participating in safety activities,
- mutually recognising the results of ICAO Universal Safety Oversight Audit Programme (USOAP) and EU Standardisation Inspections,
- monitoring and analysing States' compliance with ICAO Standards and adherence to Recommended Practices,
- cooperating in regulatory and standard-setting matters,
- developing and providing technical assistance projects and programmes,
- promoting regional cooperation,
- exchanging experts, and
- · providing training.

In the area of coordination of the ICAO USOAP and EU Standardisation Inspections, the Memorandum sets out:

- 1) The EU and ICAO agree to enhance their cooperation in the areas of USOAP and standardisation inspections in order to ensure effective use of limited resources and avoid a duplication of efforts, while preserving the universality and integrity of ICAO's USOAP.
- 2) In order to verify compliance by EU Member States with ICAO safety-related Standards and adherence to ICAO Recommended Practices, the EU and ICAO establish a framework for conducting, as appropriate:
 - a) ICAO safety oversight audits of EASA regarding safety-related SARPs that are addressed in EU legislation and with regard to certain functions and tasks which EASA performs on behalf of EU Member States; and
 - b) ICAO oversight of the EU Standardisation Inspections conducted by EASA of the national competent authorities of EU Member States regarding safety-related SARPs that are addressed by EU legislation.
- 3) The EU and ICAO establish working arrangements specifying the mechanisms and procedures necessary for the effective implementation of the framework referred to in point 2). These working arrangements shall address, inter alia, the following aspects:
 - a) the scope of ICAO USOAP intervention activities including audits and validation missions based on a comparative analysis of EU legislation and ICAO safety-related SARPs;
 - b) mutual participation in each Party's respective audit, inspection and validation activities;
 - c) information to be provided by each Party for the purposes of ICAO USOAP, and EASA Standardisation Inspections;
 - d) ensuring confidentiality where necessary, protection of data, and handling of sensitive information; and
 - e) on-site visits.



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ICAO USOAP Program and CMA overview

USOAP CMA background

The ICAO Universal Safety Oversight Audit Programme (USOAP) was launched on 1 January 1999, pursuant to a resolution A32-11, which was adopted at the 32nd Session of the ICAO Assembly, in response to widespread concerns about the adequacy of aviation safety oversight around the world.

In recognition of the success achieved by USOAP, the 33rd Session of the Assembly (22 September – 5 October 2001) adopted Assembly Resolution A33-8, which expanded the USOAP to audits of Annex 11 — Air Traffic Services, Annex 14 — Aerodromes, and other safety-related areas such as Annex 13 — Aircraft Accident and Incident Investigation.

In September 2007, the 36th Session of the Assembly adopted Resolution A36-4 directing the Council to examine different options for the continuation of the USOAP beyond 2010, including the feasibility of applying a new approach based on the concept of continuous monitoring.

Pursuant to this resolution, the Council directed the Secretariat to look at the future of the programme beyond 2010, with a view to incorporating the analysis of safety risk factors, adopting a more proactive approach, making a more effective and efficient use of ICAO resources, and increasing the role of other ICAO bureaux and the regional offices (ROs). To this effect, in July 2008 the Secretariat established a study group to examine the feasibility of adopting a CMA. Based on a comparative analysis of the benefits, constraints and implementation costs, the study group resolved that, in order to ensure efficiency, long-term sustainability and cost-effectiveness, preference should be given to the application of a CMA for the continuation of USOAP beyond 2010.

The 37th Session of the Assembly (September – October 2010) adopted Resolution A37-5, affirming that the evolution of USOAP to the CMA should be a top priority for ICAO to ensure that information on the safety performance of Member States is provided to other Member States and to the travelling public on an ongoing basis.

Critical elements of a safety oversight system

ICAO specifies eight critical elements of the safety oversight system that cover the entire area of operations in civil aviation [4,5]. The level of effective implementation of the critical elements is an indication of a State's capability for safety oversight. These are:

- 9. **Primary aviation legislation** (aviation law consistent with the environment and complexity of the State's aviation activity and compliant with the requirements contained in the Convention on International Civil Aviation).
- 10. **Specific operating regulations** (adequate regulations providing for standardized operational procedures, equipment and infrastructures (including safety management and training systems), in conformance with the Standards and Recommended Practices (SARPs) contained in the Annexes to the Convention on International Civil Aviation).
- 11. **State civil aviation system and safety oversight functions** (Civil Aviation Authority (CAA), supported by the appropriate and adequate technical and non-technical staff and provided with adequate financial resources).
- 12. **Technical personnel qualifications and training** (minimum knowledge and experience requirements for the technical personnel performing safety oversight functions and the provision of appropriate training).
- 13. **Technical guidance, tools and provision of safety-critical information** (technical guidance (including processes and procedures), tools (including facilities and equipment) and safety-critical information, to the technical



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personnel to enable them to perform their safety oversight functions in accordance with established requirements and in a standardized manner).

- 14. Licensing, certification, authorization and/or approval obligations (processes and procedures to ensure that personnel and organizations performing an aviation activity meet the established requirements before they are allowed to exercise the privileges of a licence, certificate, authorization and/or approval to conduct the relevant aviation activity).
- 15. **Surveillance obligations** (processes, such as inspections and audits, to proactively ensure that aviation licence, certificate, authorization and/or approval holders continue to meet the established requirements and function at the level of competency and safety).
- 16. **Resolution of safety concerns** (processes and procedures to resolve identified deficiencies impacting aviation safety, which may have been residing in the aviation system and have been detected by the regulatory authority).

Audit areas

The following eight audit areas have been identified in the USOAP:

- 9) primary aviation legislation and civil aviation regulations;
- 10) civil aviation organization;
- 11) personnel licensing and training;
- 12) aircraft operations;
- 13) airworthiness of aircraft;
- 14) aircraft accident and incident investigation;
- 15) air navigation services; and
- 16) aerodromes and ground aids.

The Continuous Monitoring Approach (CMA) concept

The objective of USOAP CMA is:

to promote global aviation safety through continuous monitoring of the Member States' safety oversight capabilities.

The USOAP CMA provides a mechanism for ICAO to collect safety information from Member States and other stakeholders and to analyse this information using a risk-based approach to identify and prioritize appropriate activities to be carried out by ICAO.

USOAP CMA is designed to monitor the safety oversight capabilities and safety performance of States on a continuous basis.

The CMA online framework provides ICAO. Member States and other authorized users with a suite of web-integrated applications that allow continuous monitoring and reporting of safety-related information and documentation received from different sources.

The Online Framework consists of the following:

- State Aviation Activity Questionnaires (SAAQs);
- Compliance Checklists (CCs);
- Protocol Questions (PQs);
- Mandatory Information Requests (MIRs);



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- Findings and Recommendations (F&Rs);
- Significant Safety Concerns (SSCs);
- Corrective Action Plans (CAPs).

The following cycle describes the processes of collecting and analysing data under the CMA, and how this information is then used to prioritise strategies. The CMA captures vast amounts of data from ICAO member States and other stakeholders. The cycle consists of four major components [5]:

- e) collection of safety information;
- f) determination of State safety risk profile;
- g) prioritization and conduct of USOAP CMA activities; and
- h) update of the Lack of Effective Implementation (LEI) and the status of Significant Safety Concerns (SSCs).

The first component is the process of gathering information about safety.

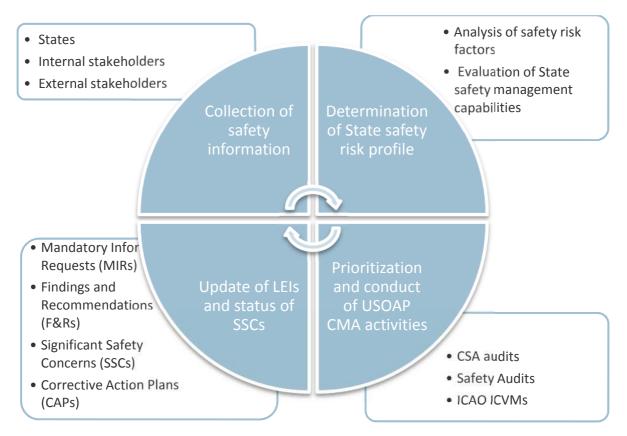
The information comes from three sources: Member States, internal and external stakeholders. Member States provide the primary source of safety information by completing, submitting and updating State Aviation Activity Questionnaire (SAAQ), Compliance Checklists (CCs - through the EFOD system) and USOAP CMA Protocol Questions (PQs).

Internal stakeholders (ICAO Secretariat, bureaux, sections and offices) provide information to the USOAP CMA that are collected and shared internally through ICAO's Integrated Safety Trend Analysis and Reporting System (ISTARS).

The third source of information is confidential safety information based on agreements with external stakeholders including national, regional, supranational and international organizations recognized by ICAO.



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The USOAP CMA components

The second component is the process of determination of State safety risk profile.

The State safety risk profile is based on various safety risk indicators that identify or highlight specific information related to a State that needs to be considered in identifying and prioritizing USOAP CMA activities.

These safety risk indicators include: Lack of Effective Implementation (LEI), Significant Safety Concern (SSC), the level of aviation activities in the State related to each audited area, the projected growth of aviation activities in the State, the level of acceptability of the State's Corrective Action Plan (CAP) and its implementation progress and progress in implementing a Safety management system (SMS) and State safety programme (SSP). The State safety risk profile is monitored on an ongoing basis at ICAO Headquarters.

Where the CMA process indicates that a State is not making progress in resolving identified Findings and Recommendations (F&Rs) and/or SSCs, or if the collected information indicates that the safety oversight system in a State has deteriorated, ICAO may take actions such as: increase the monitoring of the State, provide or facilitate assistance, consider financial or technical aid, reassess or monitor more closely existing technical assistance projects.

Next component is the process of prioritization and conduct of USOAP CMA activities

This process covers activities conducted by ICAO Monitoring and Oversight Section (CMO) and ICAO Regional office (ICAO ROs) to identify deficiencies in a State and to assess and elaborate Finding and Recommendation (F&Rs) and Significant



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Safety Concerns (SSCs). These are: Comprehensive Systems Approach (CSA) Audits, Safety Audits and ICAO Coordinated Validation Missions (ICVMs).

The objective of a CSA Audit is to determine a State's capability for safety oversight by assessing the effective implementation of the eight CEs of the safety oversight system and the status of the State's implementation of all safety-related ICAO SARPs, associated procedures, guidance material and best safety practices. The objective of a Safety Audit is to an audit of its current safety oversight system.

The objective of an ICVM is to assess and validate the status of corrective actions or mitigating measures taken by a State to address previously identified F&Rs, including SSCs. ICVMs also include on-site guidance provided to the State in resolving remaining deficiencies.

The final component is the process of update of Lack of Effective Implementations (LEIs) and status of Significant Safety Concerns (SSCs).

Estimation of collected safety information enables ICAO to continuously update the Lack of Effective Implementation (LEI) of the safety oversight capability for each State. The LEI is based on the number of applicable non-satisfactory Protocol Questions (PQs). The LEI for each State may be updated based on the information received through Mandatory Information Requests (MIRs) and Corrective Action Plans (CAPs) indicating progress made in resolving Findings and Recommendations (F&Rs) and Significant Safety Concerns (SSCs).

If an F&R is considered to be an immediate safety risk to international civil aviation, the State will be informed of the identification of an SSC and requested to take immediate mitigating or corrective actions. If appropriate evidence is not provided by the State that such actions have been taken within a specified timeframe, all Member States will be notified of the SSC through the CMA online framework.

State obligations under the USOAP CMA

Member States shall sign USOAP CMA Memorandum of Understanding (MOU) with ICAO to confirm their full support of the USOAP CMA process and to commit to actively participating in all USOAP CMA activities, including the provision of information through the CMA online framework. Member States should secure adequate resources to meet all the conditions of the MoU.

Each State is responsible for identifying one or more qualified National Continuous Monitoring Coordinators (NCMCs) to act, on an on-going basis, as primary point(s) of contact for all USOAP CMA processes and activities.

The NCMC is responsible for maintaining and updating the information to be provided by the State to the CMO Section on an on-going basis, including:

- SAAQ,
- CCs,
- State responses to PQs,



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- State responses to MIRs,
- CAPs to resolve F&Rs,
- Mitigating measures taken by the State in response to SSCs,
- The latest information regarding the SSP, and
- Other relevant safety information, as requested by ICAO.

The NCMC shall coordinate the completion and ongoing update of the CCs in order to provide the CMO with information regarding the implementation of provisions of the relevant Annexes to the Convention.

Perspectives of the use of USOAP CMA

The effective SSP implementation is one of the near-term ICAO Global Aviation Safety Plan (GASP) [7] objectives. It is a gradual process requiring time, depending on complexity of air transportation and applicable to States with mature safety oversight systems. Since 14 November 2013 the overarching safety management provisions of the Annexes have been transferred into a new **Annex 19**[2]. It is supported by guidance of Safety Management Manual (Doc 9859) which 3rd edition of 2013 was substantially enhanced. The four components of the SSP were elevated to the status of ICAO Standard to match the SMS framework. The SSP implementation timeline was organised into four phases [6]:

- Phase 1 (12 months) identification of SSP place holder, executives, establishing SSP teams, perform gap analysis, develop implementation plan, establish coordination mechanism, develop documentation.
- Phase 2 (12 months) establish a legislative framework, document safety management responsibilities, define
 State safety policy and objectives, establish accident investigation process, basic enforcement, provide for safety oversight, promote SMS education.
- Phase 3 (24 months) promulgate enforcement policy, develop harmonised legislation requiring SMS, establish safety data collection and exchange system, establish State SPIs and target levels.
- Phase 4 (24 months) review and agree upon service provider's SPIs, incorporate SMS and SPIs into routine surveillance programme, implement voluntary/confidential safety reporting, establish lower consequence indicators, promote safety information exchange among organisations across ICAO, prioritise inspections based on the analysis of safety risk, establish internal review mechanism

Starting May 14th, 2014, ICAO is going to monitor Member States' implementation of SSP through the Universal Safety Oversight Audit Programme (USOAP) [2]. The necessary input is supposed to be acquired through the adjusted USOAP State Aviation Activity Questionnaire (SAAQ) grouped in alignment with phased-approach implementation and Protocol Questionnaires (PQs) as appropriate [10].

The Memorandum of Cooperation between EU and ICAO of 2010 [14] provided a framework for enhanced cooperation including coordination of respective audits and inspection programmes avoiding duplication of efforts.

The implementation of the USOAP CMA provides ICAO effective system of continuous monitoring and management in the field of civil aviation. The system allows carrying out both corrective actions and improvement actions.



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Appendix F Safety Database

Fundamentals of Safety Database

Sound management of the organization's databases is fundamental to ensure effective and reliable safety analysis of consolidated sources of data. Depending on the size and complexity of the organization, system requirements may include a range of capabilities to effectively manage safety data. In general, the system should:

- a) include a user friendly interface for data entry and guery;
- b) have the capability of transforming large amounts of safety data into useful information that supports decision making;
- c) reduce workload for managers and safety personnel;
- d) operate at a relatively low cost.

The functional properties and attributes of different database management systems vary, and each should be considered before deciding on the most suitable system. Basic features should enable the user to perform such tasks as:

- a) log safety events under various categories;
- b) link events to related documents (e.g. reports and photographs);
- c) monitor trends;
- d) compile analyses, charts and reports;
- e) check historical records;
- f) share safety data with other organizations;
- g) monitor event investigations;
- h) monitor the implementation of corrective actions.

Safety management relies on measurement of safety indicators and monitoring. A data warehouse model facilitates performing analyses. Whereas typical database design purpose is to support On-Line Transaction Processing (OLTP), which requires primarily maintaining consistency of constantly changing data and reducing time of finding required information, while the data warehouses are designed to support On-Line Analytical Processing (OLAP), that may require pre-processing of data to provide more sophisticated information, storing historical data to find trends and patterns or mapping data for data mining. Data warehouses store integrated data, often originating from other databases, store data from long time periods, its size are measured in Terabytes (currently). It is expected that existing data are rarely modified, but regularly new data are added. It is expected that sophisticated queries can be processed in a short time. The abovementioned properties are useful for safety monitoring, as safety data originate from different sources, the data cover long time periods and safety analyses require finding trends and patterns in the safety performance.



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Overview of Safety databases

The purpose of this section of the document is to gain an insight in the context (i.e. the current environment and initiatives) in which the proposals of ASCOS are to operate. With such an insight, one can then tailor the implementation of the ASCOS proposals to ensure any proposal is both achievable and provide net benefit.

The context is characterised, for the purpose of discussing implementation, by inspection and analysis of each of the following key points;

- Aircraft accident analysis reports; There is wide recognition in the aviation industry that many lessons can and should be learnt from the analysis of accident reports.
- The annual statistical reviews of Global Accidents by ICAO, EASA, UK CAA and Boeing.
- The activity of The Safety Management International Collaboration Group (SM ICG); founded by the United States Federal Aviation Administration (FAA), the European Aviation Safety Agency (EASA) and Transport Canada Civil Aviation it is a joint cooperation between many regulatory authorities for the purpose of promoting a common understanding of safety management principles and requirements and facilitating their implementation across the international aviation community.
- Review of the UK CAA Publication (CAP) 1036. It is also possible to detect weaknesses in the
 implementation of some fundamental supporting tasks such as the variability in the reporting of
 accidents. ICAO USOAP provides an overall view of the maturity of the State Safety Programmes for
 each ICAO region.

Accident reporting criteria are not consistent throughout the world so the number of factors assigned to accidents can vary widely. As with all statistics, care must be taken when drawing conclusions from these reports.

Safety Data Collection and Processing Systems (SDCPS)

This section provides an overview of existing Safety reporting systems (International Confidential Aviation Safety Systems), in particular US and European systems.

Annex 13 to the Chicago convention stipulates that Contracting States "establish and maintain an accident and incident database to facilitate the effective analysis of information on actual or potential safety deficiencies obtained, including that from its incident reporting systems, and to determine any preventive actions required" [1], and establish a mandatory and voluntary incident reporting systems to facilitate gathering of information on actual or potential safety deficiencies [1]. Safety databases may include the following data [1]:

- Accident investigation data;
- Mandatory incident investigation data;
- Voluntary reporting data;
- Continuing airworthiness reporting data;
- Operational performance monitoring data;
- Safety risk assessment data;



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- Data from audit findings/ reports;
- Data from safety studies/ reviews;
- Safety data from other States, Regional Safety Oversight Organizations or Regional Accident & Incident Investigation Organizations; etc.

ICAO ADREP (Accident/incident data reporting)

The Accident/Incident Data Reporting (ADREP) system was established in 1976 and has since evolved to meet changes in aviation industry and ICT technology. The system gathers and stores occurrence data to assist the Contracting States in improving aviation safety. It is operated and maintained by International Civil Aviation Organisation (ICAO). The Contracting States of the Convention are required to report to ICAO the information on all aircraft accidents which involve aircraft of a maximum certificated take-off mass of over 2 250 kg and incidents involving aircraft of mass over 5700 kg.

ECCAIRS (European Co-ordination centre for Accident and Incident Reporting System)

ECCAIRS is a co-operative network of European Transport Authorities and Accident Investigation Bodies. Its mission is "to assist National and European transport entities in collecting, sharing and analysing their safety information in order to improve public transport safety" and prevent future accidents. The issue that most EU member states were collecting safety data that were not compatible was addressed. The project started operation in the early nineties and is managed by the Joint Research Centre of the European Commission on request of the Directorate General for Energy and Transport (DG TREN). In EU, directive 2003/42/EC of the EU Parliament stipulates that the member states designate competent authorities to collect and process reports on occurrences in aviation. ECCAIRS allows, through standardisation of reporting data to integrate, exchange and compare data from different member states. ECCAIRS superseded previous national reporting systems, e.g. Finnish VASA.

At the time of writing this report, the current version of the software was 5. ECCAIRS software allows creating, maintaining and deploying a repository of accident and incident reports. It is available free of charge.

The applications comprising the suite are as follows:

- Data entry and retrieval used to enter accident/incident data in repository. The browser is a front end for ECCAIRS repository, allowing data exploration. The Query Builder allows an authorised user to add and modify stored information. The ECCAIRS system implements ICAO ADREP taxonomy standards, as well as other safety taxonomies public transport domains.
- Analysis software of stored information
- Utilities useful for the system users, not found in the standard software, e.g. TARGA fills-in aircraft characteristics.
- System tools for maintenance of ECCAIRS,
- Data integration at national or European level,



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Data dissemination at national or European level.

Outputs are stored in e5f file format. ECCAIRS software is in use in many reporting systems worldwide.

AIDS - Accident/Incident Data Systems

Accident/Incident Data Systems (AIDS) is run by the FAA. Data records stored contain information on general aviation and air carrier incidents since 1978. The database is complementary to the NTSB accident database which does not contain incidents.

AR - Air Registry

FAA Air Registry (AR) database contains information on all civil aircraft registered in the United States. The database is updated in real time.

ASRS – Aviation Safety Reporting System

The U.S. Aviation Safety Reporting System (ASRS) reporting system began operation on 15 April 1976. Since its foundation, the system has been emulated in other countries and other industries. The ASRS purpose is to learn about air transport safety vulnerabilities and gain better understanding of causes of human errors. It is complementary to the mandatory, monitoring and statistical systems. The idea behind the ASRS is that knowledge about safety in air transport can be improved by asking the participants, who are willing to share their knowledge if their identities remain undisclosed. The properly structured reporting system should be confidential, voluntary and non-punitive and can be used by any person. The FAA asked NASA, as independent and highly respected entity to operate the system, since it was seen that the aviation community would be disinclined to trust and use the system due to FAA's enforcement and regulatory role. Important safety information gathered by the system (after de-identification) is open to all users across the industry. Safety alerts and results of data analyses are disseminated to the key organisations and stakeholders in the U. S. aviation.

The output of the system includes:

- Alert Bulletins on aircraft design faults, airport facilities, airspace design, navigational equipment, procedures and other issues that may compromise safety addressed to the FAA and aviation community.
- For Your Information Notices, messages on topics as above to the FAA and aviation community.
- Quick Response Studies are carried out to support the U.S. government organisations on request.
- Operational Research returns information to stakeholders and consequently improve safety.
- Database Search can be carried out on request at no cost under Freedom of Information Act provisions.
- Publications include a monthly safety bulletin CALLBACK and periodic Directline.



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 Other staff members' activities include participation in important aviation events, meetings and conferences. Twice a month, a teleconference takes place between ASRS and FAA office of safety on most important alerts and issues.

BTS - Bureau of Transportation Statistics

U.S. Bureau of Transportation Statistics database contains traffic and capacity statistics concerning individual air carrier operations. BTS is a statistical agency under the Department of Transportation.

NMACS - Near Midair Collision System

Near Midair Collision System is a database containing information on incidents where a possibility of collision took place with proximity of 500ft (152,4 m) or less and incidents reported by pilots or flight crew members when hazard of collision existed. The reports are investigated by FAA inspectors in cooperation with traffic controllers. The results of investigations are used for development of programs, policies and procedures in air transportation system.

NTSB Accident/incident reporting system

The U.S. National Transport Safety Board (NTSB) has been recording civil aircraft accident since 1967. The NTSB is conducting investigations of all accidents and incidents involving civil aircraft in the U.S. and also many U.S. owned, registered or manufactured aircraft abroad. NTSB Accident/incident database is an official repository of aviation accidents, incidents and casual factors as well as annual reports, reviews and reports from investigations (both preliminary and final) carried out by the NTSB.

RWS - Runway Incursion Database

The U.S. Runway Incursion Database contains information on events, both accidents and incidents, where aircraft, vehicle or person was present on a protected area used for take-off and landing operations. The records date back to 2005. The events are reported by an air traffic control tower responsible for given area.

WAAS - World Aircraft Accident Summary

World Aircraft Accident Summary (WAAS) was produced by Airclaims Ltd. on behalf of the British Civil Aviation Authority. The database includes brief details on all known major operational accidents worldwide that involved air carriers and larger aircraft. Presented data sources include both unofficial sources (press releases) and official reports from investigation.

ASIAS – Aviation Safety Information Analysis and Sharing

The Aviation Safety Information Analysis and Sharing (ASIAS) program was created by the Federal Aviation Administration (FAA) which promotes open exchange of information concerning safety to perform integrated searches across mainly U.S. databases. The databases that can be accessed include:



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- AIDS (incidents only),
- AR
- ASRS,
- BTS,
- NMACS,
- NTSB Aviation Accident and Incident Data System, as well as recommendations with FAA responses,
- RWS,
- WAAS.

FDM data of the US operators can be found in the ASIAS warehouse.

SAIRS - Singapore Aviation Safety Accident/Incident Reporting System

The restructured system framework SAIRS began operation in the beginning of 2010. The SAIRS Form is built on Dexter. CAAS (Civil Aviation Authority of Singapore) is managing the system. ECCAIRS was adopted as a basis operating platform for standardisation of safety data format with that of ICAO ADREP taxonomy. Safety data is validated prior to entry into database. SAIRS integrates safety data from Aerodrome and Air Navigation Service Provider.

Others

While many of the 191 countries that signed the Chicago Convention on International Civil Aviation organised reporting systems, both voluntary and mandatory, their importance is only local and insignificant from the project point of view.

Framework of Safety Data Management

Safety system quality depends on the safety data management. The scope of data management is the organisation of processes to assure that the necessary, reliable data are available and that the access to the data is efficient. After collecting safety data through various sources, organizations should then perform the necessary analysis to identify hazards and control their potential consequences.

Safety data management process elements are as follows [35]:

1. Definition of data needs.

Data to be collected, including SPIs need to be defined and a plan for data collection and use needs to be elaborated. Separate plans for data collection are needed on the service provider level, State level and EU level. Potential users (public, organisation employees, or external entities) need to be determined. The data needs and user requirements provide input for the database design.

2. Design of data architecture and data structure, including aggregation of data from different sources.



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Requirement analysis is necessary to effectively design and adjust the database. Data architecture needs to be adapted to both stored data and its planned use and update frequency. A database supports performing analyses by providing pre-processed data for immediate access.

3. Definition of format and standards to be used.

Standardisation of data and formats is needed to compare and exchange data between databases and data from different sources. Individual service providers must adapt their data format to requirements elaborated on the EU and state level. A common taxonomy need to be used (preferably ICAO ADREP). Should standardised data be unavailable, it may be necessary to create data mapping to allow data integration from various sources.

4. Development of data collection tools.

The tools facilitating collection of data need to be easy to access, while preventing unauthorised persons to access the data. Ease of use should ensure that minimum effort is needed to fill a data form, while format restrictions should prevent invalid data to be entered.

5. Sharing of safety data with other stakeholders.

The aviation community should share safety data. Shared data need to be de-identified. The foundation of the ASRS was a result of the conclusion that safety data must be shared to prevent repeating the same mistakes. A common taxonomy and standardisation of formats is important to achieve the feasibility of the data exchange. Currently available tools allow integrating data from various sources.

6. Addressing security and data protection.

Collected data requires protection from unauthorised use. Regulations on national level in different States stipulate the need to protect personal information. The basic concepts regarding security are secrecy, integrity and availability. Secrecy means that a user should only see what he is authorised to see. Integrity means that the user cannot modify data if he is not authorised. Availability means that a user can read and modify data if he is authorised. Personal data protection necessity is stipulated by regulations on the national level. Means of protection must include control of access to database by the software and also physical protection of data storage is required. A proper security policy must be elaborated and implemented to address security issues. See also chapter 3.7 in this document.

7. Data management during the database life-cycle, including adjustment.

A storage plan needs to assure that enough capacity will be provided. Data storage should be adjusted as the usage profile changes during the database lifetime. A backup plan is required to ensure continuous data availability, protect from data loss and to provide redundancy in case of database malfunctions.



Appendix A for ASCOS D2.3

WP2.3 Process for Safety Performanc Monitoring (lead participant = IoA)

ASCOS will progress beyond the state-of-the-art by developing and validating a continuous monitoring process in which safety performance indicators for each stakeholder will be linked with precursors for all the main operational issues for commercial air transport operations as identified in the European Aviation Safety Plan (EASP) framework [2, 10]. This task will investigate how CMA can be used as integral part of the life cycle processes for continued airworthiness of aircraft, and maintenance of certificates for air navigation service providers, operators, and manufacturers. ASCOS will investigate if and how flight data obtained by Flight Data Monitoring (FDM) and Flight operations Quality Assurance (FOQA) can be used to enhance the safety benefits of a multi-stakeholder CMA in aviation. [314299 ASCOS - Workplan table - 2012-05-16 15:09 - Page 8 of 29]

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Appendix A.1	SPIs linked to uneventful events
Appendix A.2	SPIs linked to procedural and flight path deviations



Appendix A.1 SPIs linked to uneventful events

	Safety Performance	Precursors		Ор	eration	al issu	e	
No.	Indicators	Precuisors	1	2	3	4	5	6
	TECHNOLOGY	Occurrences: Uneventful events	GCOL	LOC-I	CFIT	MAC	RE-TO	RE-L
1	Rate of autoflight system failures/flight	System failure affecting the operation of primary instruments / displays or standby instruments		٧		٧	V	
2		System failure affecting aircraft configuration, controllability and/or flying qualities		V			V	
3		Airspace infringement				V		
4		Other cases of loss of separation				٧		
5		Prolonged loss of communication (PLOC) between pilot and controller				V		
6		Convective weather encounter in traffic intensive airport proximity				V		
7		System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System				V		
8		Extreme icing conditions encounter		V				
9		Volcanic ash encounter		٧				
10		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution		٧				
11		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology		V				
12		Prolonged loss of communications (PLOC) between pilot and controller(s)					V	
13		Landing gear retraction failure					V	
14		Engine failure					V	
15		Cabin pressure drop as a result of pneumatic system failure					V	
16		Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll					V	
17		TCAS RA events (genuine or spurious)				V		
18		Adverse weather / poor visibility conditions / darkness				V		
19		Contaminated Runway					V	
20		Failures affecting TCAS operation				V		
21		Convective weather - heavy rain resulted with wet RWY surface					V	
1	Rate of electrical power system failures/flight	System failure affecting the operation of primary instruments / displays or standby instruments		V			٧	



	Safety Performance	Ducasinosia		Ор	eration	nal issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
2		Contaminated Runway		V			٧	
3		Volcanic ash encounter		V				
4		System failure affecting aircraft configuration, controllability and/or flying qualities		V			V	
5		Wildlife incursion		V				
6		Extreme icing conditions encounter		V			٧	
7		Fuel leak		V				
8		Engine overheating		V				
9		Convective weather encounter		V				
10		Extreme turbulence encounter		V				
11		Windshear encounter		V				
12		Failures resulting in a non-standard fuel distribution		V				
13		Uncommanded thrust asymmetry		V				
14		Bird strike		V				
15		Convective weather - heavy rain / hail resulted with engine compressor failure		V				
16		Inadequate fuel quality / type		V				
17		Low-on-fuel condition / fuel starvation		V				
18		Tire burst		V				
19		Cargo loading unsecured / shift		V				
20		Midair collision		V				
21		Collision with ground obstacle		V				
22		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution		V				
23		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology		V				
24		Engine stops during start or approach / landing		V				
25		In-flight smoke / fumes / fire (in cockpit, cabin, cargo) events that could affect the crew ability to conduct their duties and/or the aircraft controllability		V				
26		Contaminated wing		>			V	
27		Prolonged loss of communications (PLOC) between pilot and controller(s)					V	
28		Landing gear retraction failure					V	
29		Engine failure				_ 	V	



	Safety Performance	Discourage.	T	Ор	eratio	nal issu	ie	
No.	Indicators	Precursors	1	2	3	4	5	6
30		Cabin pressure drop as a result of pneumatic system failure					V	
31		Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll					V	
32		Severe engine failure		V				
33		Severe failure of all engines on transoceanic route or over rarely populated area		V				
34		Engine suffers severe surge		V				
35		Convective weather - heavy rain resulted with wet RWY surface					V	
1	Rate of flight control system failures/flight	System failure affecting the operation of primary instruments / displays or standby instruments		٧	٧	٧	٧	
2		System failure affecting aircraft configuration, controllability and/or flying qualities		V			V	
3		Contaminated Runway		V			V	
4		Adverse weather / poor visibility conditions / darkness		V	V	٧		
5		Volcanic ash encounter		V				
6		Prolonged loss of communications (PLOC) between pilot and controller(s)			V		V	
7		Wildlife incursion		V			V	
8		Extreme icing conditions encounter		V			V	
9		Error in preparation of database for FMS			V			
10		Ground Navigational Aid failure			V			
11		Inadequate NOTAM information concerning ground navigational aid failure			V			
12		GPWS / TAWS alert / warning (genuine or spurious)			V			
13		MSAW warning			V			
14		Inadequate navigational chart			V			
15		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution		V				
16		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology		V				
17		Bird strike		V			V	
18		Tire burst		V			V	
19		Airspace infringement				V		
20		Other cases of loss of separation				V		
21		Prolonged loss of communication (PLOC) between pilot and controller	1			V		
22		Convective weather encounter in traffic intensive airport proximity				V		



	Safety Performance	Ducasiyaaya		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
23		System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System				V		
24		Cargo loading unsecured / shift		V				
25		Midair collision		V				
26		Collision with ground obstacle		V				
27		Failures resulting in a non-standard fuel distribution		V				
28		Low-on-fuel condition / fuel starvation		V				
29		Fuel leak		V				
30		Engine overheating		V				
31		Convective weather encounter		V				
32		Extreme turbulence encounter		V				
33		Windshear encounter		V				
34		Uncommanded thrust asymmetry		V				
35		Convective weather - heavy rain / hail resulted with engine compressor failure		V				
36		Inadequate fuel quality / type		V				
37		In-flight smoke / fumes / fire (in cockpit, cabin, cargo) events that could affect the crew ability to conduct their duties and/or the aircraft controllability		V				
38		Landing gear retraction failure					V	
39		Engine failure					V	
40		Cabin pressure drop as a result of pneumatic system failure					V	
41		Contaminated wing		V			٧	
42		Natural or artificial obstacle on runway course			V			
43		Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll					V	
44		TCAS RA events (genuine or spurious)				V		
45		Engine stops during start or approach / landing		V				
46		Convective weather - heavy rain resulted with wet RWY surface					V	
47		Crew is incapable in result of extreme turbulence		V				
48		Severe engine failure		V				
49		Failures affecting TCAS operation				V		
1	Rate of fuel system	Contaminated Runway		V			٧	



	Safety Performance	Precursors		Op	eration	ıal issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
	failures/flight							
2		Volcanic ash encounter		V				
3		System failure affecting the operation of primary instruments / displays or standby instruments		V			٧	
4		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution		V				
5		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology		V				
6		Cargo loading unsecured / shift		V				
7		Wildlife incursion		V				
8		Midair collision		V				
9		Collision with ground obstacle		V				
10		Failures resulting in a non-standard fuel distribution		V				
11		System failure affecting aircraft configuration, controllability and/or flying qualities		V			٧	
12		Fuel leak		V				
13		Low-on-fuel condition / fuel starvation		V				
14		Engine overheating		V				
15		Convective weather encounter		V				
16		Extreme turbulence encounter		V				
17		Extreme icing conditions encounter		V				
18		Windshear encounter		V				
19		Uncommanded thrust asymmetry		V				
20		Bird strike		V				
21		Convective weather - heavy rain / hail resulted with engine compressor failure		V				
22		Inadequate fuel quality / type		V				
23		Tire burst		V				
24		In-flight smoke / fumes / fire (in cockpit, cabin, cargo) events that could affect the crew ability to conduct their duties and/or the aircraft controllability		V				
25		Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll					٧	
26		Prolonged loss of communications (PLOC) between pilot and controller(s)					٧	
27		Landing gear retraction failure					٧	
28		Engine failure				1	٧	



	Safety Performance	Data sussession		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
29		Cabin pressure drop as a result of pneumatic system failure					V	
30		Gross loading error		V				
31		Engine stops during start or approach / landing		V				
32		Crew is incapable in result of extreme turbulence		V				
33		Convective weather - heavy rain resulted with wet RWY surface					V	
1	Rate of hydraulic power system failure/flight	Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	٧	٧				
2		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	V	V				
3		Contaminated Runway		V			V	
4		Cargo loading unsecured / shift		V				
5		Volcanic ash encounter		V				
6		Midair collision		V				
7		Collision with ground obstacle		V				
8		System failure affecting aircraft configuration, controllability and/or flying qualities		V			V	
9		Wildlife incursion		V				
10		System failure affecting the operation of primary instruments / displays or standby instruments		V			٧	
11		In-flight smoke / fumes / fire (in cockpit, cabin, cargo) events that could affect the crew ability to conduct their duties and/or the aircraft controllability		٧				
12		Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure)	V					
13		Adverse weather / poor visibility conditions / darkness	V					
14		Taxiway incursion	٧					
15		Stand confusion	٧					
16		Lack of adherence to SOP for GND movements in terms of marshalling procedure	٧					
17		Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication.	٧					
18		Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	٧					
19		Flaws in ground equipment maintenance process	٧					
20		Landing gear retraction failure					V	
21		Prolonged loss of communications (PLOC) between pilot and controller(s)					V	
22		Engine failure					V	



	Safety Performance	_		Op	eration	nal issu	ie	
No.	Indicators	Precursors	1	2	3	4	5	6
23		Cabin pressure drop as a result of pneumatic system failure					٧	
24		Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll					V	
25		Convective weather - heavy rain resulted with wet RWY surface					V	
1	Rate of ice/rain protection system failures/flight	System failure affecting aircraft configuration, controllability and/or flying qualities		٧			٧	
2		System failure affecting the operation of primary instruments / displays or standby instruments		V			V	
3		Extreme icing conditions encounter		٧			٧	
4		Contaminated Runway		٧			٧	
5		Convective weather encounter		٧				
6		Convective weather - heavy rain / hail resulted with engine compressor failure		٧				
7		Bird strike		٧				
8		Volcanic ash encounter		٧				
9		Fuel leak		٧				
10		Extreme turbulence encounter		٧				
11		Windshear encounter		٧				
12		Failures resulting in a non-standard fuel distribution		V				
13		Tire burst		٧				
14		Uncommanded thrust asymmetry		V				
15		Inadequate fuel quality / type		V				
16		Low-on-fuel condition / fuel starvation		V				
17		Engine overheating		V				
18		Wildlife incursion		V				
19		Engine stops during start or approach / landing		V				
20		Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll					V	
21		Contaminated wing		V			V	
22		Prolonged loss of communications (PLOC) between pilot and controller(s)					V	
23		Landing gear retraction failure					V	
24		Engine failure					V	
25		Cabin pressure drop as a result of pneumatic system failure					V	



	Safety Performance	Discourage.		Ор	eration	nal issu	<u> </u>	
No.	Indicators	Precursors	1	2	3	4	5	6
26		Severe engine failure		V				
27		Severe failure of all engines on transoceanic route or over rarely populated area		V				
28		Crew is incapable in result of extreme turbulence		٧				
29		Engine suffers severe surge		V				
30		Convective weather - heavy rain resulted with wet RWY surface					٧	
1	Rate of landing gear system failures/flight	Contaminated Runway		٧			٧	٧
2		Tire burst		V			٧	V
3		System failure affecting aircraft configuration, controllability and/or flying qualities		V			٧	
4		Wildlife incursion		V			٧	V
5		System failure affecting the operation of primary instruments / displays or standby instruments		V			٧	V
6		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	V	V				V
7		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	V	V				V
8		Volcanic ash encounter		V				
9		Bird strike		V			٧	V
10		Adverse weather / poor visibility conditions / darkness	V	V				V
11		Convective weather encounter		V				V
12		Hard landing		V				V
13		Convective weather / turbulence / windshear or crosswind conditions during take-off		V			V	V
14		Cargo loading unsecured / shift		V				
15		Midair collision		V				
16		Collision with ground obstacle		V				
17		Bounced landing		V				V
18		Deep (long) landing		V				V
19		Fuel leak		V				
20		Engine overheating		V				
21		Extreme turbulence encounter		V				
22		Extreme icing conditions encounter		V				
23		Windshear encounter	1	V				



	Safety Performance	Drocurrors		Op	eratio	nal issu	ie	
No.	Indicators	Precursors	1	2	3	4	5	6
24		Failures resulting in a non-standard fuel distribution		V				
25		Uncommanded thrust asymmetry		V				
26		Convective weather - heavy rain / hail resulted with engine compressor failure		V				
27		Inadequate fuel quality / type		V				
28		Low-on-fuel condition / fuel starvation		V				
29		Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly						٧
30		In-flight smoke / fumes / fire (in cockpit, cabin, cargo) events that could affect the crew ability to conduct their duties and/or the aircraft controllability		V				
31		Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure)	V					
32		Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	V				V	
33		Taxiway incursion	٧					
34		Stand confusion	٧					
35		Landing gear retraction failure					V	
36		Lack of adherence to SOP for GND movements in terms of marshalling procedure	٧					
37		Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication.	V					
38		Flaws in ground equipment maintenance process	V					
39		Prolonged loss of communications (PLOC) between pilot and controller(s)					V	
40		Engine failure					V	
41		Cabin pressure drop as a result of pneumatic system failure					V	
42		Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll					V	
43		Continued unstabilized approach (failure to comply with go-around criteria and policy)						V
44		Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown		V				V
45		Frontal surface encounter						V
46		Convective weather / turbulence / windshear encounter conditions during landing						V
47		System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)		V				٧
48		Convective weather - heavy rain resulted with wet RWY surface					V	
49		Crew is incapable in result of shock related to hard landing		V				٧
50		Engine stops during start or approach / landing		V				



	Safety Performance	Duranina		Ор	eration			
No.	Indicators	Precursors	1	2	3	4	5	6
51		Emergency landing					V	
52		Crew is incapable in result of extreme turbulence		V				
53		Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate					V	
54		Cautions / warnings (genuine or spurious) that may lead to a low-speed or high-speed rejected take-off					٧	
55		Risk of dangerous occurences appeared during take-off roll					٧	
56		Temporary loss of directional control during rollout						V
1	Rate of navigation system failures/flight	System failure affecting the operation of primary instruments / displays or standby instruments					V	
2		System failure affecting aircraft configuration, controllability and/or flying qualities					V	
3		Prolonged loss of communications (PLOC) between pilot and controller(s)					V	
4		Landing gear retraction failure					V	
5		Engine failure					V	
6		Cabin pressure drop as a result of pneumatic system failure					V	
7		Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll					V	
8		Contaminated Runway					٧	
9		Convective weather - heavy rain resulted with wet RWY surface					V	
1	Rate of powerplant system failures/flight	Contaminated Runway		V			V	
2		System failure affecting aircraft configuration, controllability and/or flying qualities		V			٧	
3		System failure affecting the operation of primary instruments / displays or standby instruments		V			٧	V
4		Volcanic ash encounter		V				
5		Wildlife incursion		V			V	
6		Bird strike		V			V	
7		Tire burst		V			V	
8		Uncommanded thrust asymmetry		V				
9		Convective weather encounter		V				٧
10		Convective weather - heavy rain / hail resulted with engine compressor failure		V				
11		Extreme icing conditions encounter		V				
12		Failures resulting in a non-standard fuel distribution		V				



	Safety Performance	Operational issue							
No.	Indicators	Precursors	1	2	3	4	5	6	
13		Extreme turbulence encounter		V					
14		Windshear encounter		V					
15		Fuel leak		V					
16		Inadequate fuel quality / type		V					
17		Low-on-fuel condition / fuel starvation		V					
18		Engine overheating		V					
19		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	V	V					
20		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	V	V					
21		Cargo loading unsecured / shift		V					
22		Midair collision		V					
23		Collision with ground obstacle		V					
24		Convective weather / turbulence / windshear or crosswind conditions during take-off		V			٧	V	
25		Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate					V		
26		Engine stops during start or approach / landing		V					
27		Adverse weather / poor visibility conditions / darkness	٧	V				V	
28		In-flight smoke / fumes / fire (in cockpit, cabin, cargo) events that could affect the crew ability to conduct their duties and/or the aircraft controllability		V					
29		Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure)	V						
30		Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	V				V		
31		Taxiway incursion	V						
32		Stand confusion	V						
33		Lack of adherence to SOP for GND movements in terms of marshalling procedure	V						
34		Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication.	٧						
35		Flaws in ground equipment maintenance process	٧						
36		Engine failure					V		
37		Cabin pressure drop as a result of pneumatic system failure					V		
38		Prolonged loss of communications (PLOC) between pilot and controller(s)					V		
39		Landing gear retraction failure					V		
40		Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll					V		



	Safety Performance Indicators	Precursors		Operational issue					
No.			1	2	3	4	5	6	
41		Gross loading error		V					
42		System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)		V				V	
43		Severe engine failure		V					
44		Hard landing		V				V	
45		Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown		V				V	
46		Convective weather - heavy rain resulted with wet RWY surface					V		
47		Severe failure of all engines on transoceanic route or over rarely populated area		V					
48		Emergency landing					V		
49		Crew is incapable in result of extreme turbulence		V					
50		Engine suffers severe surge		V					
51		Cautions / warnings (genuine or spurious) that may lead to a low-speed or high-speed rejected take-off					٧		
52		Frontal surface encounter						V	
53		Convective weather / turbulence / windshear encounter conditions during landing						V	
54		Risk of dangerous occurences appeared during take-off roll					V		
55		Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly						٧	
56		Bounced landing						٧	
57		Deep (long) landing						٧	
58		Temporary loss of directional control during rollout				1		٧	



	Safety Performance	Precursors		Ор	e			
No.	Indicators	Indicators		2	3	4	5	6
	HUMAN	Occurrences: Uneventful events	GCOL	LOC-I	CFIT	MAC	RE-TO	RE-L
1	Rate of runway incursions/flight	Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	V	٧				
2		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	V	V				
3		Adverse weather / poor visibility conditions / darkness	V	V				
4		Contaminated Runway		V			V	
5		Emergency landing	V				V	
6		Midair collision		V				
7		Collision with ground obstacle		V				
8		Wildlife incursion		V			V	
9		Cargo loading unsecured / shift		V				
10		Volcanic ash encounter		V				
11		Runway confusion	V					
12		Taxiway confusion	V					
13		Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWY.	V					
14		In-flight smoke / fumes / fire (in cockpit, cabin, cargo) events that could affect the crew ability to conduct their duties and/or the aircraft controllability		V				
15		System failure affecting aircraft configuration, controllability and/or flying qualities		V			V	
16		Bird strike		V			V	
17		System failure affecting the operation of primary instruments / displays or standby instruments		V			V	
18		Prolonged loss of communications (PLOC) between pilot and controller(s)					V	
19		Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll					V	
20		Convective weather / turbulence / windshear or crosswind conditions during take-off					V	
21		Landing gear retraction failure					٧	
22		Engine failure					V	
23		Cabin pressure drop as a result of pneumatic system failure					V	
24		Risk of dangerous occurences appeared during take-off roll					V	
25		Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.					V	
26		Extreme turbulence encounter		V				



	Safety Performance	ety Performance Indicators Precursors	Operational issue							
No.	Indicators		1	2	3	4	5	6		
27		Crew incapacitation resulted from illness (e.g. food poisoning)		V						
28		Convective weather - heavy rain resulted with wet RWY surface					V	·		
1	Rate of taxiway incursions/flight	Adverse weather / poor visibility conditions / darkness	٧	٧						
2		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	V	V						
3		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	V	V						
4		Flaws in ground equipment maintenance process	V							
5		Runway confusion	V							
6		Taxiway confusion	V							
7		Emergency landing	V							
8		Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWY.	V							
9		Taxiway incursion	V							
10		Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	V							
11		Lack of adherence to SOP for GND movements in terms of marshalling procedure	V					. 		
12		Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure)	V							
13		Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication.	V					. 		
14		Stand confusion	V							
15		Extreme turbulence encounter		V						
16		System failure affecting aircraft configuration, controllability and/or flying qualities		V						
17		System failure affecting the operation of primary instruments / displays or standby instruments		V						
18		In-flight smoke / fumes / fire (in cockpit, cabin, cargo) events that could affect the crew ability to conduct their duties and/or the aircraft controllability		٧						
19		Bird strike		V						
20		Crew incapacitation resulted from illness (e.g. food poisoning)		V						
1	Rate of stall warnings/flight	System failure affecting the operation of primary instruments / displays or standby instruments		V			V			
2		System failure affecting aircraft configuration, controllability and/or flying qualities		V			٧			
3		Extreme icing conditions encounter		V			٧			
4		Convective weather encounter		V				٧		
5		Contaminated Runway		V			٧			
6		Bird strike		V			٧			
7		Extreme turbulence encounter		V						



	Safety Performance	Dec courses		Ор	eration	nal issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
8		Tire burst		V			V	
9		Volcanic ash encounter		V				
10		Uncommanded thrust asymmetry		V				
11		Wildlife incursion		V			V	
12		Windshear encounter		V				
13		Adverse weather / poor visibility conditions / darkness		V				V
14		Failures resulting in a non-standard fuel distribution		V				
15		Convective weather - heavy rain / hail resulted with engine compressor failure		V				
16		Fuel leak		V				
17		Inadequate fuel quality / type		V				
18		Low-on-fuel condition / fuel starvation		V				
19		Engine overheating		V				
20		Convective weather / turbulence / windshear or crosswind conditions during take-off		V				V
21		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution		V				
22		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology		V				
23		Hard landing		V				V
24		Bounced landing		V				V
25		Engine stops during start or approach / landing		V				
26		Deep (long) landing		V				V
27		Turbulence encounter		V				
28		Frontal surface encounter		V				
29		Contaminated wing		V			V	
30		Gross loading error		V				
31		Cargo loading unsecured / shift		V				
32		Landing gear retraction failure					V	
33		Engine failure					V	
34		Cabin pressure drop as a result of pneumatic system failure					V	
35		inadequate anti-ice fluid holdover Time (HOT)		V				
36		Extreme icing condition and / or heavy snow. Break in airport operation due to adverse weather or / and necessity of RWY surface maintenance.		٧				
37		Prolonged loss of communications (PLOC) between pilot and controller(s)					V	



	Safety Performance	Draguesas		Ор	eration	nal issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
38		Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll					V	
39		In-flight smoke / fumes / fire (in cockpit, cabin, cargo) events that could affect the crew ability to conduct their duties and/or		V				
		the aircraft controllability		V				
40		Cautions / warnings (genuine or spurious) that may lead to a low-speed or high-speed rejected take-off					V	
41		Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either						V
		intentionally or unknowingly						v
42		Continued unstabilized approach (failure to comply with go-around criteria and policy)						V
43		Severe engine failure		V				
44		Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate		V			V	>
45		Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown		V				>
46		Crew incapacitation resulted from illness (e.g. food poisoning)		V				
47		System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)	Į.	V				V
48		Severe failure of all engines on transoceanic route or over rarely populated area		V				·
49		Convective weather - heavy rain resulted with wet RWY surface					V	·
50		Crew is incapable in result of shock related to hard landing		V				V
51		Cabin pressure drop as a result of aircraft structural failure		V				
52		Crew is incapable in result of extreme turbulence		V				
53		Engine suffers severe surge		V				
1	Rate of bank angle alerts/flight	System failure affecting the operation of primary instruments / displays or standby instruments		٧			V	V
2		System failure affecting aircraft configuration, controllability and/or flying qualities		V			V	
3		Convective weather / turbulence / windshear or crosswind conditions during take-off		V			V	V
4		Adverse weather / poor visibility conditions / darkness		V				V
5		Extreme icing conditions encounter		V				
6		Convective weather encounter		V				V
7		Volcanic ash encounter		V				
8		Uncommanded thrust asymmetry		V				
9		Contaminated Runway		V			٧	
10		Extreme turbulence encounter		V				
11		Windshear encounter		V				
12		Bird strike		V			V	



	Safety Performance	Discourse		Operational issue					
No.	Indicators	Precursors	1	2	3	4	5	6	
13		Failures resulting in a non-standard fuel distribution		V					
14		Wildlife incursion		V			V		
15		Convective weather - heavy rain / hail resulted with engine compressor failure		V					
16		Fuel leak		V					
17		Inadequate fuel quality / type		V					
18		Low-on-fuel condition / fuel starvation		V					
19		Tire burst		V					
20		Engine overheating		V					
21		Hard landing		V				V	
22		Bounced landing		V				V	
23		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution		V					
24		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology		V					
25		Engine stops during start or approach / landing		V					
26		Deep (long) landing		V				V	
27		AOA prevents missed approach		V				V	
28		Gross loading error		V					
29		Cargo loading unsecured / shift		V					
30		Turbulence encounter		V					
31		Landing gear retraction failure					V		
32		Frontal surface encounter		V					
33		Emergency landing					V		
34		Continued unstabilized approach (failure to comply with go-around criteria and policy)		V				V	
35		Prolonged loss of communications (PLOC) between pilot and controller(s)					V		
36		Engine failure					V		
37		Cabin pressure drop as a result of pneumatic system failure					V	 	
38		Risk of dangerous occurences appeared during take-off roll					V	 	
39		Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll					V	 	
40		Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.					V		
41		Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly						V	
42		Severe engine failure		V					



	Safety Performance	D		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
43		Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown		V				V
44		System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)		V				V
45		Severe failure of all engines on transoceanic route or over rarely populated area		V				
46		Missed approach execution necessary after prolonged flight due to e. g. extreme weather		V				V
47		Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate		V				V
48		Convective weather - heavy rain resulted with wet RWY surface					V	
49		Crew is incapable in result of shock related to hard landing		V				V
50		Crew is incapable in result of extreme turbulence		V				
51		Engine suffers severe surge		V				
1	Rate of near CFIT/flight	System failure affecting the operation of primary instruments / displays or standby instruments		V	V		V	V
2		Adverse weather / poor visibility conditions / darkness		V	V			V
3		Contaminated Runway		V			V	
4		System failure affecting aircraft configuration, controllability and/or flying qualities		V			V	i
5		Volcanic ash encounter		V				
6		Convective weather / turbulence / windshear or crosswind conditions during take-off		V				V
7		Convective weather encounter		V				V
8		Wildlife incursion		V				
9		Bird strike		V				
10		Extreme turbulence encounter		V				
11		Fuel leak		V				
12		Extreme icing conditions encounter		V				i
13		Windshear encounter		V				
14		Failures resulting in a non-standard fuel distribution		V				
15		Convective weather - heavy rain / hail resulted with engine compressor failure		V				
16		Tire burst		V				
17		Uncommanded thrust asymmetry		V				-
18		Inadequate fuel quality / type		V				-
19		Low-on-fuel condition / fuel starvation		V			$\overline{}$	1
20		Prolonged loss of communications (PLOC) between pilot and controller(s)			V		V	1
21		Engine overheating		V				1
22		GPWS / TAWS alert / warning (genuine or spurious)			V		$\overline{}$	<u> </u>



	Safety Performance	Decompose		Ор	eration	nal issu	<u> </u>	
No.	Indicators	Precursors	1	2	3	4	5	6
23		MSAW warning			V			
24		Ground Navigational Aid failure			V			
25		Inadequate NOTAM information concerning ground navigational aid failure			V			
26		Error in preparation of database for FMS			V			
27		Inadequate navigational chart			V			
28		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution		٧				
29		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology		٧				
30		Midair collision		٧				
31		Collision with ground obstacle		٧				
32		Cargo loading unsecured / shift		V				
33		Hard landing		V				V
34		Bounced landing		V				V
35		In-flight smoke / fumes / fire (in cockpit, cabin, cargo) events that could affect the crew ability to conduct their duties and/or						
		the aircraft controllability		V				1
36		Engine stops during start or approach / landing		V				
37		Deep (long) landing		V				V
38		AOA prevents missed approach		٧				٧
39		Continued unstabilized approach (failure to comply with go-around criteria and policy)		V				V
40		Natural or artificial obstacle on runway course			V			
41		Landing gear retraction failure					٧	
42		Engine failure					٧	
43		Cabin pressure drop as a result of pneumatic system failure					V	
44		Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll					V	
45		Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either						.,
		intentionally or unknowingly						V
46		Severe engine failure		V				
47		Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown		٧				٧
48		Crew incapacitation resulted from illness (e.g. food poisoning)		٧				
49		System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)		V				٧
50		Severe failure of all engines on transoceanic route or over rarely populated area		٧				
51		Missed approach execution necessary after prolonged flight due to e. g. extreme weather		٧				V



	Safety Performance	Durantenana		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
52		Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate		V				V
53		Crew is incapable in result of shock related to hard landing		V				V
54		Cabin pressure drop as a result of aircraft structural failure		V				
55		Crew is incapable in result of extreme turbulence		V				
56		Engine suffers severe surge		V				
57		Convective weather - heavy rain resulted with wet RWY surface					V	
1	Rate of deviation from glideslope/approach	System failure affecting the operation of primary instruments / displays or standby instruments		٧	٧			٧
2		Adverse weather / poor visibility conditions / darkness		V	V			V
3		Contaminated Runway		V				
4		Volcanic ash encounter		V				
5		System failure affecting aircraft configuration, controllability and/or flying qualities		V				
6		Convective weather encounter		V				٧
7		Convective weather / turbulence / windshear or crosswind conditions during take-off		V				V
8		Wildlife incursion		V				
9		Uncommanded thrust asymmetry		V				
10		Convective weather - heavy rain / hail resulted with engine compressor failure		V				
11		Extreme icing conditions encounter		٧				
12		Bird strike		٧				
13		Extreme turbulence encounter		٧				
14		Windshear encounter		٧				
15		Failures resulting in a non-standard fuel distribution		V				
16		Fuel leak		٧				
17		Inadequate fuel quality / type		٧				
18		Low-on-fuel condition / fuel starvation		V				
19		Tire burst		V				
20		Engine overheating		V				
21		GPWS / TAWS alert / warning (genuine or spurious)			V			
22		MSAW warning			V			
23		Ground Navigational Aid failure			V			
24		Inadequate NOTAM information concerning ground navigational aid failure			V			



	Safety Performance	Discourage.		Ор	eration	nal issu	<u> </u>	
No.	Indicators	Precursors	1	2	3	4	5	6
25		Prolonged loss of communications (PLOC) between pilot and controller(s)			V			
26		Error in preparation of database for FMS			V			
27		Inadequate navigational chart			V			
28		Midair collision		V				
29		Collision with ground obstacle		V				
30		Cargo loading unsecured / shift		V				
31		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution		V				
32		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology		V				
33		Hard landing		V				V
34		Bounced landing		V				V
35		Deep (long) landing		V				V
36		Engine stops during start or approach / landing		V				
37		Frontal surface encounter						V
38		AOA prevents missed approach		V				V
39		In-flight smoke / fumes / fire (in cockpit, cabin, cargo) events that could affect the crew ability to conduct their duties and/or the aircraft controllability		٧				
40		Convective weather / turbulence / windshear encounter conditions during landing						V
41		Natural or artificial obstacle on runway course			V			
42		Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown		V				V
43		Severe engine failure		V				
44		Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly						V
45		System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)		V				V
46		Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate		V				V
47		Continued unstabilized approach (failure to comply with go-around criteria and policy)		V				V
48		Severe failure of all engines on transoceanic route or over rarely populated area		V				
49		Missed approach execution necessary after prolonged flight due to e. g. extreme weather		V				V
50		Crew is incapable in result of shock related to hard landing		V				٧
51		Crew is incapable in result of extreme turbulence		V				
52		Engine suffers severe surge		V				
1	Rate of deviation from	Adverse weather / poor visibility conditions / darkness		V	V			V



	Safety Performance	Data street and		Ор	eration	nal issu	<u> </u>	
No.	Indicators	Precursors	1	2	3	4	5	6
	localizer/approach							
2		System failure affecting the operation of primary instruments / displays or standby instruments		V	V			V
3		Convective weather / turbulence / windshear or crosswind conditions during take-off		V				V
4		Contaminated Runway		V				
5		Convective weather encounter		V				V
6		System failure affecting aircraft configuration, controllability and/or flying qualities		V				
7		Bird strike		V				
8		Volcanic ash encounter		V				
9		Fuel leak		V				
10		Extreme turbulence encounter		V				
11		Extreme icing conditions encounter		V				
12		Windshear encounter		V				
13		Failures resulting in a non-standard fuel distribution		V				
14		Convective weather - heavy rain / hail resulted with engine compressor failure		V				
15		Tire burst		V				
16		Uncommanded thrust asymmetry		V				
17		Inadequate fuel quality / type		V				
18		Low-on-fuel condition / fuel starvation		V				
19		Engine overheating		V				
20		Wildlife incursion		V				
21		GPWS / TAWS alert / warning (genuine or spurious)			V			
22		MSAW warning			V			
23		Ground Navigational Aid failure			V			
24		Inadequate NOTAM information concerning ground navigational aid failure			V			
25		Prolonged loss of communications (PLOC) between pilot and controller(s)			V			
26		Error in preparation of database for FMS			V			
27		Inadequate navigational chart			V			
28		Hard landing		V				V
29		Engine stops during start or approach / landing		V				
30		Bounced landing		V				V
31		Deep (long) landing		V				V



	Safety Performance	Durantenana		Op	eration	nal issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
32		AOA prevents missed approach		V				V
33		Natural or artificial obstacle on runway course			V			
34		Severe engine failure		V				
35		Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown		V				V
36		Continued unstabilized approach (failure to comply with go-around criteria and policy)		V				V
37		System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)		V				V
38		Severe failure of all engines on transoceanic route or over rarely populated area		V				
39		Missed approach execution necessary after prolonged flight due to e. g. extreme weather		V				V
40		Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate		V				V
41		Crew is incapable in result of shock related to hard landing		V				V
42		Crew is incapable in result of extreme turbulence		V				
43		Engine suffers severe surge		V				
1	Rate of level bust at low altitude/flight	System failure affecting the operation of primary instruments / displays or standby instruments		V	V	V	V	٧
2		Contaminated Runway		V			V	
3		Adverse weather / poor visibility conditions / darkness		V	V	V		V
4		System failure affecting aircraft configuration, controllability and/or flying qualities		V			V	
5		Wildlife incursion		V			V	
6		Volcanic ash encounter		V				
7		Bird strike		V			V	
8		Convective weather / turbulence / windshear or crosswind conditions during take-off		V				V
9		Tire burst		V			V	
10		Convective weather encounter		V				V
11		Failures resulting in a non-standard fuel distribution		٧				
12		Uncommanded thrust asymmetry		V				
13		Convective weather - heavy rain / hail resulted with engine compressor failure		V				
14		Extreme icing conditions encounter		V				
15		Extreme turbulence encounter		V				
16		Windshear encounter		V				
17		Fuel leak		V				
18		Inadequate fuel quality / type		V				



	Safety Performance	Description		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
19		Low-on-fuel condition / fuel starvation		V				
20		Engine overheating		V				
21		Prolonged loss of communications (PLOC) between pilot and controller(s)			V		V	
22		Error in preparation of database for FMS			V			
23		Ground Navigational Aid failure			V			
24		Inadequate NOTAM information concerning ground navigational aid failure			V			
25		Inadequate navigational chart			V			
26		Cargo loading unsecured / shift		٧				
27		GPWS / TAWS alert / warning (genuine or spurious)			V			
28		MSAW warning			V			
29		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution		٧				
30		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology		V				
31		Midair collision		V				
32		Collision with ground obstacle		٧				
33		Hard landing		٧				V
34		Airspace infringement				٧		
35		Other cases of loss of separation				٧		
36		Prolonged loss of communication (PLOC) between pilot and controller				٧		
37		Convective weather encounter in traffic intensive airport proximity				٧		
38		System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System				V		
39		Bounced landing		٧				V
40		Engine stops during start or approach / landing		٧				
41		Deep (long) landing		٧				V
42		AOA prevents missed approach		٧				V
43		In-flight smoke / fumes / fire (in cockpit, cabin, cargo) events that could affect the crew ability to conduct their duties and/or		W				
		the aircraft controllability		V				1
44		Gross loading error		٧				
45		Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll					V	
46		Continued unstabilized approach (failure to comply with go-around criteria and policy)		V				V
47		Natural or artificial obstacle on runway course			V			
48		Landing gear retraction failure					V	



	Safety Performance	Draguesara		Ор	eration	nal issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
49		Engine failure					V	
50		Cabin pressure drop as a result of pneumatic system failure					V	
51		Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either						V
		intentionally or unknowingly						V
52		Severe engine failure		V				
53		Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown		V				V
54		TCAS RA events (genuine or spurious)				V		
55		System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)		V				V
56		Severe failure of all engines on transoceanic route or over rarely populated area		V				
57		Missed approach execution necessary after prolonged flight due to e. g. extreme weather		V				V
58		Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate		V				V
59		Convective weather - heavy rain resulted with wet RWY surface					V	
60		Crew is incapable in result of shock related to hard landing		V				V
61		Crew is incapable in result of extreme turbulence		V				
62		Engine suffers severe surge		V				
63		Failures affecting TCAS operation				V		
1	Rate of separation minima infringements	Adverse weather / poor visibility conditions / darkness	V	V		V		V
	(ROC>7)/flight	Adverse weather / poor visionity conditions / darkness	V	V		V		
2		System failure affecting the operation of primary instruments / displays or standby instruments		V		V	V	V
3		System failure affecting aircraft configuration, controllability and/or flying qualities		V			V	
4		Contaminated Runway		V			V	
5		Volcanic ash encounter		V				
6		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	٧	V				
7		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	V	V				
8		Convective weather / turbulence / windshear or crosswind conditions during take-off		V			V	V
9		Convective weather encounter		V		٧		٧
10		Extreme turbulence encounter		V				
11		Wildlife incursion		V			٧	
12		Bird strike		V			٧	
13		Windshear encounter		V				



	Safety Performance	Durantenant		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
14		Uncommanded thrust asymmetry		V				
15		Convective weather - heavy rain / hail resulted with engine compressor failure		V				
16		Extreme icing conditions encounter		V				
17		Failures resulting in a non-standard fuel distribution		V				
18		Fuel leak		V				
19		Inadequate fuel quality / type		V				
20		Low-on-fuel condition / fuel starvation		V				
21		Tire burst		V				
22		Engine overheating		V				
23		Emergency landing	V				V	
24		Midair collision		V				
25		Collision with ground obstacle		V				
26		Airspace infringement				٧		
27		Prolonged loss of communication (PLOC) between pilot and controller				٧		
28		Cargo loading unsecured / shift		V				
29		Other cases of loss of separation				V		
30		Convective weather encounter in traffic intensive airport proximity				V		
31		System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System				V		
32		Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	V				V	
33		Runway confusion	V					
34		Taxiway confusion	V					
35		In-flight smoke / fumes / fire (in cockpit, cabin, cargo) events that could affect the crew ability to conduct their duties and/or the aircraft controllability		V				
36		Hard landing		V				V
37		Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWY.	V					
38		Flaws in ground equipment maintenance process	V					
39		Engine stops during start or approach / landing		V				
40		Taxiway incursion	V					
41		Bounced landing		V				V
42		Deep (long) landing		V				V
43		AOA prevents missed approach		V				V



	Safety Performance	Draguesara		Op	eration	nal issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
44		Lack of adherence to SOP for GND movements in terms of marshalling procedure	V					
45		Turbulence encounter		V				
46		Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure)	V					
47		Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication.	V					
48		Stand confusion	V					
49		Frontal surface encounter		V				
50		Prolonged loss of communications (PLOC) between pilot and controller(s)					V	
51		Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll					V	
52		Landing gear retraction failure					V	
53		Engine failure					V	
54		Cabin pressure drop as a result of pneumatic system failure					V	
55		Risk of dangerous occurences appeared during take-off roll					V	
56		Severe engine failure		V				
57		Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown		V				V
58		Crew incapacitation resulted from illness (e.g. food poisoning)		V				
59		TCAS RA events (genuine or spurious)				V		
60		Continued unstabilized approach (failure to comply with go-around criteria and policy)		V				V
61		System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)		V				V
62		Severe failure of all engines on transoceanic route or over rarely populated area		V				
63		Missed approach execution necessary after prolonged flight due to e. g. extreme weather		V				V
64		Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate		V				V
65		Convective weather - heavy rain resulted with wet RWY surface					V	
66		Crew is incapable in result of shock related to hard landing		V				V
67		Cabin pressure drop as a result of aircraft structural failure		V				
68		Crew is incapable in result of extreme turbulence		V				
69		Engine suffers severe surge		٧				
70		Failures affecting TCAS operation				V		
1	Rate of airspace infringements/flight	System failure affecting the operation of primary instruments / displays or standby instruments		V	V	V	V	٧
2		Adverse weather / poor visibility conditions / darkness		V	V	V		٧
3		Contaminated Runway		V			V	1



	Safety Performance	D		Ор	eration	nal issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
4		System failure affecting aircraft configuration, controllability and/or flying qualities		V			V	
5		Volcanic ash encounter		V				
6		Convective weather / turbulence / windshear or crosswind conditions during take-off		V			V	V
7		Wildlife incursion		V			V	
8		Bird strike		V			V	
9		Convective weather encounter		V		V		V
10		Uncommanded thrust asymmetry		V				
11		Convective weather - heavy rain / hail resulted with engine compressor failure		V				
12		Extreme turbulence encounter		V				
13		Extreme icing conditions encounter		V				
14		Windshear encounter		V				
15		Failures resulting in a non-standard fuel distribution		V				
16		Fuel leak		V				
17		Inadequate fuel quality / type		V				
18		Low-on-fuel condition / fuel starvation		V				
19		Tire burst		V				
20		Engine overheating		V				
21		Prolonged loss of communications (PLOC) between pilot and controller(s)			V		V	
22		GPWS / TAWS alert / warning (genuine or spurious)			V			
23		MSAW warning			V			
24		Ground Navigational Aid failure			V			
25		Inadequate NOTAM information concerning ground navigational aid failure			V			
26		Error in preparation of database for FMS			V			
27		Inadequate navigational chart			V			
28		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution		V				
29		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology		V				
30		Midair collision		V				
31		Collision with ground obstacle		V				
32		Airspace infringement				V		
33		Prolonged loss of communication (PLOC) between pilot and controller				V		
34		Cargo loading unsecured / shift		V				



	Safety Performance	Durantenant		Ор	eratior	nal issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
35		Other cases of loss of separation				V		
36		System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System				V		
37		Convective weather encounter in traffic intensive airport proximity				V		
38		In-flight smoke / fumes / fire (in cockpit, cabin, cargo) events that could affect the crew ability to conduct their duties and/or		V				
		the aircraft controllability		V				
39		Hard landing		V				V
40		Engine stops during start or approach / landing		V				
41		Bounced landing		V				V
42		Deep (long) landing		V				V
43		AOA prevents missed approach		V				V
44		Emergency landing					V	
45		Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll					V	
46		Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.					V	
47		Natural or artificial obstacle on runway course			V			
48		Landing gear retraction failure					V	
49		Engine failure					V	
50		Cabin pressure drop as a result of pneumatic system failure					V	
51		Risk of dangerous occurences appeared during take-off roll					V	
52		Severe engine failure		V				
53		Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown		V				V
54		Crew incapacitation resulted from illness (e.g. food poisoning)		V				
55		TCAS RA events (genuine or spurious)				V		
56		Continued unstabilized approach (failure to comply with go-around criteria and policy)		V				V
57		System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)		V				V
58		Severe failure of all engines on transoceanic route or over rarely populated area		V				
59		Missed approach execution necessary after prolonged flight due to e. g. extreme weather		V				V
60		Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate		V				V
61		Convective weather - heavy rain resulted with wet RWY surface					V	
62		Crew is incapable in result of shock related to hard landing		V				V
63		Cabin pressure drop as a result of aircraft structural failure		V				
64		Crew is incapable in result of extreme turbulence		V				



	Safety Performance	Dec. company	T	Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
65		Engine suffers severe surge		V				
66		Failures affecting TCAS operation				V		
1	Rate of level busts/flight	System failure affecting the operation of primary instruments / displays or standby instruments		V	V	V	V	V
2		System failure affecting aircraft configuration, controllability and/or flying qualities		V			V	
3		Adverse weather / poor visibility conditions / darkness		V	V	V		V
4		Volcanic ash encounter		V				
5		Contaminated Runway		V			V	
6		Extreme icing conditions encounter		V				
7		Convective weather encounter		V		V		V
8		Extreme turbulence encounter		V				
9		Windshear encounter		V				
10		Convective weather / turbulence / windshear or crosswind conditions during take-off		V				V
11		Uncommanded thrust asymmetry		V				
12		Wildlife incursion		V				
13		Failures resulting in a non-standard fuel distribution		V				
14		Bird strike		V				
15		Convective weather - heavy rain / hail resulted with engine compressor failure		V				
16		Fuel leak		V				
17		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution		V				
18		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology		V				
19		Inadequate fuel quality / type		V				
20		Low-on-fuel condition / fuel starvation		V				
21		Tire burst		V				
22		Engine overheating		V				
23		Prolonged loss of communications (PLOC) between pilot and controller(s)			V		V	
24		Error in preparation of database for FMS			V			
25		Ground Navigational Aid failure			V			
26		Inadequate NOTAM information concerning ground navigational aid failure			V			
27		Inadequate navigational chart			V			
28		Cargo loading unsecured / shift		V				
29		GPWS / TAWS alert / warning (genuine or spurious)			V			



	Safety Performance	Dura susura se		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
30		MSAW warning			V			
31		Midair collision		V				
32		Collision with ground obstacle		V				
33		Prolonged loss of communication (PLOC) between pilot and controller				٧		
34		Airspace infringement				V		
35		Other cases of loss of separation				٧		
36		Convective weather encounter in traffic intensive airport proximity				٧		
37		System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System				٧		
38		In-flight smoke / fumes / fire (in cockpit, cabin, cargo) events that could affect the crew ability to conduct their duties and/or		V				
		the aircraft controllability		V				1
39		Hard landing		V				V
40		Engine stops during start or approach / landing		V				
41		Bounced landing		V				V
42		Deep (long) landing		V				V
43		AOA prevents missed approach		V				V
44		Turbulence encounter		V				
45		Frontal surface encounter		V				
46		Engine failure					V	
47		Cabin pressure drop as a result of pneumatic system failure					V	
48		Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll					V	
49		Gross loading error		V				
50		Natural or artificial obstacle on runway course			V			
51		Landing gear retraction failure					V	
52		Severe engine failure		V				
53		Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown		V				V
54		Crew incapacitation resulted from illness (e.g. food poisoning)		V				
55		TCAS RA events (genuine or spurious)				V		
56		Continued unstabilized approach (failure to comply with go-around criteria and policy)		V				V
57		System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)		V				V
58		Severe failure of all engines on transoceanic route or over rarely populated area		V				
59		Missed approach execution necessary after prolonged flight due to e. g. extreme weather		V				V



	Safety Performance	D		Ор	eration	nal issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
60		Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate		V				V
61		Crew is incapable in result of shock related to hard landing		V				V
62		Cabin pressure drop as a result of aircraft structural failure		V				
63		Crew is incapable in result of extreme turbulence		V				
64		Engine suffers severe surge		V				
65		Failures affecting TCAS operation				V		
66		Convective weather - heavy rain resulted with wet RWY surface					V	
1	Rate of high speed rejected take-off/attempted take-off	System failure affecting the operation of primary instruments / displays or standby instruments		٧			٧	
2		System failure affecting aircraft configuration, controllability and/or flying qualities		V			V	
3		Contaminated Runway		V			V	
4		Wildlife incursion		V			V	
5		Bird strike		V			V	
6		Volcanic ash encounter		V				
7		Tire burst		V			V	
8		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	V	V				
9		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	V	V				
10		Convective weather encounter		V				
11		Extreme icing conditions encounter		V			V	
12		Uncommanded thrust asymmetry		V				
13		Failures resulting in a non-standard fuel distribution		V				
14		Extreme turbulence encounter		V				
15		Convective weather - heavy rain / hail resulted with engine compressor failure		V				
16		Fuel leak		V				
17		Windshear encounter		V				
18		Inadequate fuel quality / type		V				
19		Low-on-fuel condition / fuel starvation		V				
20		Engine overheating		V				
21		Convective weather / turbulence / windshear or crosswind conditions during take-off		V			V	
22		Cargo loading unsecured / shift		V				
23		Adverse weather / poor visibility conditions / darkness	V	V				



	Safety Performance	Ducasinosus		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
24		Emergency landing	V				V	
25		Midair collision		V				
26		Collision with ground obstacle		V				
27		Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate		V			V	
28		Runway confusion	V					
29		Taxiway confusion	V					
30		Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWY.	V					
31		Engine stops during start or approach / landing		V				
32		Frontal surface encounter		V				
33		In-flight smoke / fumes / fire (in cockpit, cabin, cargo) events that could affect the crew ability to conduct their duties and/or the aircraft controllability		٧				
34		Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll					V	
35		Gross loading error		V				
36		Prolonged loss of communications (PLOC) between pilot and controller(s)	,				V	
37		Landing gear retraction failure					V	
38		Risk of dangerous occurences appeared during take-off roll	,				٧	
39		Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	,				V	
40		Contaminated wing		V			V	
41		Engine failure					٧	
42		Cabin pressure drop as a result of pneumatic system failure					V	
43		Cautions / warnings (genuine or spurious) that may lead to a low-speed or high-speed rejected take-off					٧	
44		Convective weather - heavy rain resulted with wet RWY surface					V	
45		Severe engine failure		V				
46		Crew incapacitation resulted from illness (e.g. food poisoning)		V				
47		Severe failure of all engines on transoceanic route or over rarely populated area		V				
48		Crew is incapable in result of extreme turbulence		V				
49		Engine suffers severe surge		V				
1	Rate of continued approach (go around not conducted) following unstabilised approach/approach	Adverse weather / poor visibility conditions / darkness	V	V	V			V



	Safety Performance	Descriptions		Ор	eration	nal issu	<u> </u>	
No.	Indicators	Precursors	1	2	3	4	5	6
2		System failure affecting the operation of primary instruments / displays or standby instruments		V	V		V	V
3		Convective weather / turbulence / windshear or crosswind conditions during take-off		V			V	V
4		Convective weather encounter		V				V
5		Contaminated Runway		V			V	V
6		Bird strike		V			V	V
7		System failure affecting aircraft configuration, controllability and/or flying qualities		V			V	
8		Wildlife incursion		V			V	V
9		Tire burst		V				V
10		Volcanic ash encounter		V				
11		Fuel leak		V				
12		Extreme turbulence encounter		V				
13		Extreme icing conditions encounter		V				
14		Windshear encounter		V				
15		Failures resulting in a non-standard fuel distribution		V				
16		Convective weather - heavy rain / hail resulted with engine compressor failure		V				
17		Uncommanded thrust asymmetry		V				
18		Inadequate fuel quality / type		V				
19		Low-on-fuel condition / fuel starvation		V				
20		Prolonged loss of communications (PLOC) between pilot and controller(s)			V		٧	
21		Engine overheating		V				
22		GPWS / TAWS alert / warning (genuine or spurious)			V			
23		MSAW warning			V			
24		Ground Navigational Aid failure			V			
25		Inadequate NOTAM information concerning ground navigational aid failure			V			
26		Inadequate navigational chart			V			
27		Error in preparation of database for FMS			V			
28		Emergency landing	V				V	
29		Hard landing		V				V
30		Bounced landing		V				V
31		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	V					V
32		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	V					V



	Safety Performance	Draguesara		Ор	eration	al issu	<u> </u>	
No.	Indicators	Precursors	1	2	3	4	5	6
33		Deep (long) landing		V				V
34		Runway confusion	V					
35		Engine stops during start or approach / landing		V				
36		Taxiway confusion	V					
37		Frontal surface encounter						V
38		Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWY.	V					
39		AOA prevents missed approach		V				V
40		Landing gear retraction failure					V	
41		Convective weather / turbulence / windshear encounter conditions during landing						V
42		Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.					V	
43		Natural or artificial obstacle on runway course			V			
44		Engine failure					V	
45		Cabin pressure drop as a result of pneumatic system failure					V	
46		Risk of dangerous occurences appeared during take-off roll					V	
47		Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll					V	
48		Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown		V				V
49		Severe engine failure		V				
50		Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either						V
		intentionally or unknowingly						
51		System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)		V				V
52		Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate		V				V
53		Continued unstabilized approach (failure to comply with go-around criteria and policy)		V				V
54		Severe failure of all engines on transoceanic route or over rarely populated area		V				
55		Missed approach execution necessary after prolonged flight due to e. g. extreme weather		V				V
56		Convective weather - heavy rain resulted with wet RWY surface					V	
57		Crew is incapable in result of shock related to hard landing		V				V
58		Crew is incapable in result of extreme turbulence		V				
59		Engine suffers severe surge		V				1
1	Rate of long landings/landing	Adverse weather / poor visibility conditions / darkness		٧	V			٧
2		Convective weather / turbulence / windshear or crosswind conditions during take-off		V				V



	Safety Performance	Draguesara		Ор	eration	nal issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
3		System failure affecting the operation of primary instruments / displays or standby instruments		V	V		V	V
4		Prolonged loss of communications (PLOC) between pilot and controller(s)			V		V	
5		Error in preparation of database for FMS			V			1
6		GPWS / TAWS alert / warning (genuine or spurious)			V			
7		MSAW warning			V			
8		Ground Navigational Aid failure			V			
9		Inadequate NOTAM information concerning ground navigational aid failure			V			
10		Inadequate navigational chart			V			
11		Hard landing		V				V
12		Bounced landing		V				V
13		Deep (long) landing		V				V
14		AOA prevents missed approach		V				V
15		Convective weather encounter		V				V
16		System failure affecting aircraft configuration, controllability and/or flying qualities					V	
17		Natural or artificial obstacle on runway course			V			
18		Landing gear retraction failure					V	
19		Engine failure					V	
20		Cabin pressure drop as a result of pneumatic system failure					V	
21		Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll					V	
22		Temporary loss of directional control during rollout						V
23		Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown		V				V
24		Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either						.,
		intentionally or unknowingly						V
25		System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)		V				V
26		Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate		V				V
27		Continued unstabilized approach (failure to comply with go-around criteria and policy)		V				V
28		Missed approach execution necessary after prolonged flight due to e. g. extreme weather		V				V
29		Frontal surface encounter						V
30		Convective weather / turbulence / windshear encounter conditions during landing						V
31		Crew is incapable in result of shock related to hard landing		V				V
32		Contaminated Runway					V	



	Safety Performance	D		Ор	eration	nal issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
33		Convective weather - heavy rain resulted with wet RWY surface					V	
1	Rate of excessive approach speed event/approach	Adverse weather / poor visibility conditions / darkness		٧	V	V		V
2		System failure affecting the operation of primary instruments / displays or standby instruments		V	V	V		V
3		Convective weather / turbulence / windshear or crosswind conditions during take-off		V				V
4		Ground Navigational Aid failure			V			
5		Inadequate NOTAM information concerning ground navigational aid failure			V			
6		Error in preparation of database for FMS			V			
7		Inadequate navigational chart			V			
8		GPWS / TAWS alert / warning (genuine or spurious)			V			
9		MSAW warning			V			
10		Prolonged loss of communications (PLOC) between pilot and controller(s)			V			
11		Convective weather encounter		V				V
12		Hard landing		V				V
13		Bounced landing		V				V
14		Airspace infringement				V		
15		Other cases of loss of separation				V		
16		Prolonged loss of communication (PLOC) between pilot and controller				V		
17		Convective weather encounter in traffic intensive airport proximity				V		
18		System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System				V		
19		Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly						٧
20		Deep (long) landing		V				V
21		Frontal surface encounter						V
22		AOA prevents missed approach		V				V
23		Continued unstabilized approach (failure to comply with go-around criteria and policy)		V				V
24		Convective weather / turbulence / windshear encounter conditions during landing						V
25		Natural or artificial obstacle on runway course			V			
26		Temporary loss of directional control during rollout						V
27		Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown		V				V
28		System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)		V				V



	Safety Performance	Precursors		Op	eration	al issue	e	
No.	Indicators	FIELUISOIS	1	2	3	4	5	6
29		Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate		V				V
30		TCAS RA events (genuine or spurious)				V		
31		Missed approach execution necessary after prolonged flight due to e. g. extreme weather		V				V
32		Crew is incapable in result of shock related to hard landing		V				V
33		Failures affecting TCAS operation				V		



	Safety Performance	Ducasingons		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
	ORGANISATION	Occurrences: Uneventful events	GCOL	LOC-I	CFIT	MAC	RE-TO	RE-L
1	Rate of unstable approaches/landing	System failure affecting the operation of primary instruments / displays or standby instruments		V	V		V	V
2		Adverse weather / poor visibility conditions / darkness		>	٧			٧
3		System failure affecting aircraft configuration, controllability and/or flying qualities		V			V	
4		Convective weather encounter		>				٧
5		Convective weather / turbulence / windshear or crosswind conditions during take-off		V				٧
6		Contaminated Runway		٧			٧	
7		Uncommanded thrust asymmetry		٧				
8		Convective weather - heavy rain / hail resulted with engine compressor failure		٧			i	
9		Extreme icing conditions encounter		V				
10		Bird strike		٧				
11		Volcanic ash encounter		V			i '	
12		Extreme turbulence encounter		٧			i	
13		Windshear encounter		٧				
14		Failures resulting in a non-standard fuel distribution		٧			i	
15		Fuel leak		٧				
16		Inadequate fuel quality / type		٧				
17		Low-on-fuel condition / fuel starvation		٧				
18		Tire burst		٧				
19		Engine overheating		٧				
20		Wildlife incursion		٧			i	
21		Prolonged loss of communications (PLOC) between pilot and controller(s)			V		٧	
22		GPWS / TAWS alert / warning (genuine or spurious)			V			
23		MSAW warning			V			
24		Ground Navigational Aid failure			V		i	
25		Inadequate NOTAM information concerning ground navigational aid failure			V		i	
26		Error in preparation of database for FMS			V		1	
27		Inadequate navigational chart			V		i	
28		Hard landing		V			i	٧
29		Bounced landing		V			1	٧
30		Deep (long) landing		V				٧
31		Engine stops during start or approach / landing		٧			1	
32		Frontal surface encounter					1	٧



	Safety Performance	Drogueore		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
33		AOA prevents missed approach		V			<u> </u>	V
34		Landing gear retraction failure					V	
35		Convective weather / turbulence / windshear encounter conditions during landing					<u> </u>	V
36		Natural or artificial obstacle on runway course			V			
37		Engine failure					٧	
38		Cabin pressure drop as a result of pneumatic system failure					٧	
39		Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll					٧	
40		Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown		٧				٧
41		Severe engine failure		V				
42		Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either						
		intentionally or unknowingly					1	V
43		System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)		V				V
44		Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate		V				٧
45		Continued unstabilized approach (failure to comply with go-around criteria and policy)		V				٧
46		Severe failure of all engines on transoceanic route or over rarely populated area		V				
47		Missed approach execution necessary after prolonged flight due to e. g. extreme weather		٧				٧
48		Crew is incapable in result of shock related to hard landing		V				٧
49		Crew is incapable in result of extreme turbulence		٧				
50		Engine suffers severe surge		٧				
51		Convective weather - heavy rain resulted with wet RWY surface					٧	
1	Rate of deep landings/landing	System failure affecting the operation of primary instruments / displays or standby instruments		٧	V	٧		٧
2		Adverse weather / poor visibility conditions / darkness		V	V	V		٧
3		System failure affecting aircraft configuration, controllability and/or flying qualities		V				
4		Convective weather / turbulence / windshear or crosswind conditions during take-off		V				٧
5		Uncommanded thrust asymmetry		٧				
6		Contaminated Runway		V				
7		Convective weather encounter		٧				٧
8		Volcanic ash encounter		٧				
9		Bird strike		٧				
10		Convective weather - heavy rain / hail resulted with engine compressor failure		V				
11		Fuel leak		V				
12		Extreme turbulence encounter		V				1
13		Extreme icing conditions encounter		٧				1
14		Windshear encounter		V				
15		Inadequate fuel quality / type		٧				
16		Failures resulting in a non-standard fuel distribution		V				



	Safety Performance	Precursors		Op	eration	e		
No.	Indicators	Precuisors	1	2	3	4	5	6
17		Tire burst		٧			 1	
18		Low-on-fuel condition / fuel starvation		V				
19		Engine overheating		٧				
20		Wildlife incursion		V				
21		Ground Navigational Aid failure			V			
22		Inadequate NOTAM information concerning ground navigational aid failure			V			
23		Error in preparation of database for FMS			V			
24		Inadequate navigational chart			V			
25		GPWS / TAWS alert / warning (genuine or spurious)			V			
26		MSAW warning			V			
27		Prolonged loss of communications (PLOC) between pilot and controller(s)			V			
28		Airspace infringement				V		
29		Other cases of loss of separation				V		
30		Prolonged loss of communication (PLOC) between pilot and controller				٧		
31		Convective weather encounter in traffic intensive airport proximity				٧		
32		System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System				٧		
33		Hard landing		٧				٧
34		Engine stops during start or approach / landing		V				
35		Bounced landing		V				V
36		Deep (long) landing		V				V
37		AOA prevents missed approach		V				٧
38		Natural or artificial obstacle on runway course			V			
39		Severe engine failure		V				
40		Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown		V				V
41		TCAS RA events (genuine or spurious)				V		
42		Continued unstabilized approach (failure to comply with go-around criteria and policy)		V				V
43		System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)		V				V
44		Severe failure of all engines on transoceanic route or over rarely populated area		V				
45		Missed approach execution necessary after prolonged flight due to e. g. extreme weather		V				V
46		Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate		٧				٧
47		Crew is incapable in result of shock related to hard landing		V				٧
48		Crew is incapable in result of extreme turbulence		V				
49		Engine suffers severe surge		٧			·	
50		Failures affecting TCAS operation				V		
1	Rate of flight crew failure to	Adverse weather / poor visibility conditions / darkness						
	deploy ground			V				V
	spoilers/landing							



	Safety Performance	Precursors		Ор	eration	al issu	e	
No.	Indicators	Fiecuisois	1	2	3	4	5	6
2		Convective weather / turbulence / windshear or crosswind conditions during take-off		٧			V	٧
3		Hard landing		٧			1	٧
4		Bounced landing		٧				٧
5		Deep (long) landing		٧				V
6		AOA prevents missed approach		V			ł	٧
7		System failure affecting the operation of primary instruments / displays or standby instruments		V			٧	٧
8		System failure affecting aircraft configuration, controllability and/or flying qualities					٧	
9		Convective weather encounter		V				٧
10		Prolonged loss of communications (PLOC) between pilot and controller(s)					٧	
11		Landing gear retraction failure					٧	
12		Engine failure					V	
13		Cabin pressure drop as a result of pneumatic system failure					٧	
14		Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll					V	
15		Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either					1	.,
		intentionally or unknowingly					ł	V
16		Temporary loss of directional control during rollout						٧
17		Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate		V			V	٧
18		Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown		V				٧
19		Wildlife incursion					٧	
20		System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)		V				٧
21		Bird strike					٧	
22		Contaminated Runway					٧	
23		Tire burst					٧	
24		Continued unstabilized approach (failure to comply with go-around criteria and policy)		٧				٧
25		Missed approach execution necessary after prolonged flight due to e. g. extreme weather		٧				٧
26		Crew is incapable in result of shock related to hard landing		٧				٧
27		Emergency landing					٧	
28		Cautions / warnings (genuine or spurious) that may lead to a low-speed or high-speed rejected take-off					٧	
29		Convective weather - heavy rain resulted with wet RWY surface					٧	
30		Risk of dangerous occurences appeared during take-off roll					٧	
31		Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.					V	
1	Rate of delayed brake	Adverse weather / poor visibility conditions / darkness		T.,				T.,
	application/landing			V			l	V
2		Convective weather / turbulence / windshear or crosswind conditions during take-off		٧			V	V
3		Hard landing		V				V
4		Bounced landing		V				V
5		Deep (long) landing		V				V



	Safety Performance	Draguesara		Ор	eration	al issu	<u> </u>	
No.	Indicators	Precursors	1	2	3	4	5	6
6		AOA prevents missed approach		V				V
7		System failure affecting the operation of primary instruments / displays or standby instruments		٧			٧	V
8		System failure affecting aircraft configuration, controllability and/or flying qualities					٧	
9		Convective weather encounter		٧				٧
10		Landing gear retraction failure					V	
11		Prolonged loss of communications (PLOC) between pilot and controller(s)					٧	
12		Engine failure					V	
13		Cabin pressure drop as a result of pneumatic system failure					V	
14		Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll					V	
15		Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either						.,
		intentionally or unknowingly					l	V
16		Temporary loss of directional control during rollout					·	٧
17		Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate		٧			٧	٧
18		Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown		٧			·	٧
19		Wildlife incursion					V	
20		System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)		V				V
21		Bird strike					٧	
22		Contaminated Runway					V	
23		Tire burst					V	
24		Continued unstabilized approach (failure to comply with go-around criteria and policy)		V				V
25		Missed approach execution necessary after prolonged flight due to e. g. extreme weather		V				V
26		Crew is incapable in result of shock related to hard landing		٧				٧
27		Emergency landing					٧	
28		Cautions / warnings (genuine or spurious) that may lead to a low-speed or high-speed rejected take-off					٧	
29		Convective weather - heavy rain resulted with wet RWY surface					٧	
30		Risk of dangerous occurences appeared during take-off roll					٧	
31		Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.					٧	
1	Rate of delayed application	Adverse weather / poor visibility conditions / darkness		.,				,,
	of thrust reversers/landing			V			l	V
2		Convective weather / turbulence / windshear or crosswind conditions during take-off		٧			٧	٧
3		Hard landing		٧				V
4		Bounced landing		V				V
5		Deep (long) landing		V				V
6		AOA prevents missed approach		V				V
7		Convective weather encounter		V				V
8		Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either						T
		intentionally or unknowingly					l	V



	Safety Performance	Discourses		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
9		Temporary loss of directional control during rollout						V
10		System failure affecting the operation of primary instruments / displays or standby instruments		V			V	V
11		Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate		V			V	V
12		Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown		V				٧
13		Wildlife incursion					٧	
14		System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)		V				V
15		Bird strike					٧	
16		Tire burst					V	
17		Continued unstabilized approach (failure to comply with go-around criteria and policy)		V				V
18		System failure affecting aircraft configuration, controllability and/or flying qualities					٧	
19		Contaminated Runway					V	
20		Missed approach execution necessary after prolonged flight due to e. g. extreme weather		V				V
21		Crew is incapable in result of shock related to hard landing		V				٧
22		Emergency landing					٧	
23		Cautions / warnings (genuine or spurious) that may lead to a low-speed or high-speed rejected take-off					٧	
24		Prolonged loss of communications (PLOC) between pilot and controller(s)					٧	
25		Landing gear retraction failure					٧	
26		Engine failure					٧	
27		Cabin pressure drop as a result of pneumatic system failure					٧	
28		Risk of dangerous occurences appeared during take-off roll					٧	
29		Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll					٧	
30		Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.					٧	
1	Rate of level-busts/flight	System failure affecting the operation of primary instruments / displays or standby instruments		V	V	٧	٧	V
2	, ,	System failure affecting aircraft configuration, controllability and/or flying qualities		V			٧	
3		Contaminated Runway		V			٧	
4		Adverse weather / poor visibility conditions / darkness		V	V	V		V
5		Volcanic ash encounter		V				
6		Extreme icing conditions encounter		V				
7		Convective weather encounter		V		V		V
8		Wildlife incursion		V			٧	
9		Bird strike		V			V	
10		Extreme turbulence encounter		V				—
11		Convective weather / turbulence / windshear or crosswind conditions during take-off		V				V
12		Windshear encounter		V				
13		Tire burst		V			V	<u> </u>
14		Failures resulting in a non-standard fuel distribution		V			_	
15		Uncommanded thrust asymmetry		V				†



	Safety Performance	Draguesara		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
16		Convective weather - heavy rain / hail resulted with engine compressor failure		٧				
17		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution		V				
18		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology		٧				
19		Fuel leak		٧				
20		Inadequate fuel quality / type		٧				
21		Low-on-fuel condition / fuel starvation		٧				
22		Engine overheating		٧				
23		Prolonged loss of communications (PLOC) between pilot and controller(s)			V		٧	
24		Error in preparation of database for FMS			V			
25		Ground Navigational Aid failure			V			
26		Inadequate NOTAM information concerning ground navigational aid failure			V			
27		Inadequate navigational chart			V			
28		Cargo loading unsecured / shift		٧				
29		GPWS / TAWS alert / warning (genuine or spurious)			V			
30		MSAW warning			V			
31		Midair collision		V				
32		Collision with ground obstacle		٧				
33		Prolonged loss of communication (PLOC) between pilot and controller				٧		
34		Airspace infringement				V		
35		Other cases of loss of separation				V		
36		Convective weather encounter in traffic intensive airport proximity				٧		
37		Hard landing		V				٧
38		System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System				V		
39		Bounced landing		V				٧
40		In-flight smoke / fumes / fire (in cockpit, cabin, cargo) events that could affect the crew ability to conduct their duties and/or the aircraft controllability		٧				
41		Engine stops during start or approach / landing		٧				
42		Deep (long) landing		٧				٧
43		AOA prevents missed approach		٧				٧
44		Turbulence encounter		٧				
45		Frontal surface encounter		V				
46		Gross loading error		V				
47		Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll					V	
48		Continued unstabilized approach (failure to comply with go-around criteria and policy)		٧				٧
49		Natural or artificial obstacle on runway course			V			
50		Landing gear retraction failure					V	
51		Engine failure					V	



	Safety Performance	Ducasina		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
52		Cabin pressure drop as a result of pneumatic system failure					٧	
53		Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either						V
		intentionally or unknowingly						V
54		Severe engine failure		٧				
55		Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown		V				V
56		Crew incapacitation resulted from illness (e.g. food poisoning)		V				
57		TCAS RA events (genuine or spurious)				٧		
58		System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)		٧				٧
59		Severe failure of all engines on transoceanic route or over rarely populated area		٧				
60		Missed approach execution necessary after prolonged flight due to e. g. extreme weather		٧				٧
61		Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate		V				٧
62		Convective weather - heavy rain resulted with wet RWY surface					٧	
63		Crew is incapable in result of shock related to hard landing		V				V
64		Cabin pressure drop as a result of aircraft structural failure		V				
65		Crew is incapable in result of extreme turbulence		V				
66		Engine suffers severe surge		V				
67		Failures affecting TCAS operation				V		
1	Rate of navigation errors	Adverse weather / poor visibility conditions / darkness						
	which result in a loss of			.,	١.,	١.,		١.,
	separation with another			V	V	V		V
	aircraft/flight							
2		System failure affecting the operation of primary instruments / displays or standby instruments		٧	V	V	V	V
3		Convective weather / turbulence / windshear or crosswind conditions during take-off		٧			٧	٧
4		Prolonged loss of communications (PLOC) between pilot and controller(s)			V		٧	
5		GPWS / TAWS alert / warning (genuine or spurious)			V			
6		MSAW warning			V			
7		Error in preparation of database for FMS			V			
8		Ground Navigational Aid failure			V			
9		Inadequate NOTAM information concerning ground navigational aid failure			V			
10		Inadequate navigational chart			V			
11		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution		V				
12		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology		V				
13		Contaminated Runway	1	V			V	
14		Midair collision	1	V				
15		Collision with ground obstacle	1	V				
16		Airspace infringement	1	Ť		V		<u> </u>
17		Prolonged loss of communication (PLOC) between pilot and controller				V		



	Safety Performance	Drocursors		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
18		Cargo loading unsecured / shift		V			<u> </u>	
19		Volcanic ash encounter		٧			1	
20		Wildlife incursion		٧			٧	
21		Other cases of loss of separation				٧	1	
22		Convective weather encounter in traffic intensive airport proximity				٧	1	
23		System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System				٧	1	
24		System failure affecting aircraft configuration, controllability and/or flying qualities		V			V	
25		In-flight smoke / fumes / fire (in cockpit, cabin, cargo) events that could affect the crew ability to conduct their duties and/or the aircraft controllability		٧				
26		Hard landing		V				V
27		Bounced landing		V				V
28		Deep (long) landing		V				V
29		AOA prevents missed approach		V				V
30		Bird strike		V			V	
31		Emergency landing					V	
32		Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll					V	
33		Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.					V	
34		Natural or artificial obstacle on runway course			V			
35		Landing gear retraction failure					V	
36		Engine failure					V	
37		Cabin pressure drop as a result of pneumatic system failure					V	
38		Risk of dangerous occurences appeared during take-off roll					V	
39		Extreme turbulence encounter		V				
40		Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown		V				V
41		Crew incapacitation resulted from illness (e.g. food poisoning)		V				
42		Convective weather encounter		V		٧	1	V
43		TCAS RA events (genuine or spurious)				V		
44		Continued unstabilized approach (failure to comply with go-around criteria and policy)		V				V
45		System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)		V				V
46		Missed approach execution necessary after prolonged flight due to e. g. extreme weather		V				V
47		Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate		V				V
48		Convective weather - heavy rain resulted with wet RWY surface					V	†
49		Crew is incapable in result of shock related to hard landing		٧			l	V
50		Cabin pressure drop as a result of aircraft structural failure		V				
51		Failures affecting TCAS operation				V	i	
1	Rate of incorrect flight crew response to genuine TCAS	System failure affecting the operation of primary instruments / displays or standby instruments		V	V	٧	V	



	Safety Performance	Precursors	1	Ор	eration	al issu	e	
No.	Indicators	Precuisors	1	2	3	4	5	6
	RA warnings/warning							
2		System failure affecting aircraft configuration, controllability and/or flying qualities		٧			V	
3		Contaminated Runway		V			٧	
4		Volcanic ash encounter		٧				
5		Convective weather encounter		٧		٧		
6		Wildlife incursion		V			V	
7		Extreme turbulence encounter		٧			l	
8		Bird strike		V			٧	
9		Windshear encounter		٧			l	
10		Failures resulting in a non-standard fuel distribution		٧			l	
11		Uncommanded thrust asymmetry		V			1	
12		Convective weather - heavy rain / hail resulted with engine compressor failure		V				
13		Extreme icing conditions encounter		٧				
14		Fuel leak		V				
15		Inadequate fuel quality / type		V				
16		Low-on-fuel condition / fuel starvation		٧				
17		Tire burst		V			1	
18		Engine overheating		V				
19		Prolonged loss of communications (PLOC) between pilot and controller(s)			V		V	
20		Adverse weather / poor visibility conditions / darkness		٧	V	٧		
21		Ground Navigational Aid failure			V		1	
22		Inadequate NOTAM information concerning ground navigational aid failure			V			
23		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution		V			1	
24		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology		V			1	
25		Error in preparation of database for FMS			V			
26		Inadequate navigational chart			V			
27		GPWS / TAWS alert / warning (genuine or spurious)			V	l l	1	
28		MSAW warning			V			
29		Cargo loading unsecured / shift		V			1	
30		Midair collision		٧		l l	1	
31		Collision with ground obstacle		V				
32		Airspace infringement				V		
33		Prolonged loss of communication (PLOC) between pilot and controller				V		
34		Other cases of loss of separation				V		
35		Convective weather encounter in traffic intensive airport proximity				V		
36		System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System				V		
37		Engine stops during start or approach / landing		٧			1	



	Safety Performance	Dranusara		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
38		In-flight smoke / fumes / fire (in cockpit, cabin, cargo) events that could affect the crew ability to conduct their duties and/or the aircraft controllability		٧				
39		Turbulence encounter		V				
40		Frontal surface encounter		٧				
41		Emergency landing					٧	
42		Convective weather / turbulence / windshear or crosswind conditions during take-off					V	
43		Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll					V	
44		Natural or artificial obstacle on runway course			V			
45		Landing gear retraction failure					V	
46		Engine failure					V	
47		Cabin pressure drop as a result of pneumatic system failure					٧	
48		Risk of dangerous occurences appeared during take-off roll					٧	
49		Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.					٧	
50		Gross loading error		V				
51		Severe engine failure		V				
52		Crew incapacitation resulted from illness (e.g. food poisoning)		V				
53		TCAS RA events (genuine or spurious)				٧		
54		Severe failure of all engines on transoceanic route or over rarely populated area		V				
55		Convective weather - heavy rain resulted with wet RWY surface					٧	
56		Crew is incapable in result of extreme turbulence		V				
57		Engine suffers severe surge		V				
58		Failures affecting TCAS operation				V		
1	Rate of loss of separation events/flight	System failure affecting the operation of primary instruments / displays or standby instruments		٧	V	V	٧	٧
2		Adverse weather / poor visibility conditions / darkness		V	V	V		٧
3		System failure affecting aircraft configuration, controllability and/or flying qualities		V			V	
4		Contaminated Runway		V			V	
5		Volcanic ash encounter		V				
6		Convective weather / turbulence / windshear or crosswind conditions during take-off		V			٧	٧
7		Convective weather encounter		V		٧		V
8		Extreme turbulence encounter		٧				
9		Wildlife incursion		٧			٧	
10		Bird strike		V			٧	
11		Windshear encounter		٧				
12		Failures resulting in a non-standard fuel distribution		V				
13		Uncommanded thrust asymmetry		V				
14		Convective weather - heavy rain / hail resulted with engine compressor failure		V				



	Safety Performance	Discourage		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
15		Extreme icing conditions encounter		V			<u> </u>	
16		Fuel leak		٧		l l	1	
17		Inadequate fuel quality / type		٧				
18		Low-on-fuel condition / fuel starvation		٧		l l	1	
19		Tire burst		٧				
20		Engine overheating		٧				
21		Prolonged loss of communications (PLOC) between pilot and controller(s)			V		٧	
22		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution		٧		l l	1	
23		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology		V			1	
24		GPWS / TAWS alert / warning (genuine or spurious)			V		1	
25		MSAW warning			V			
26		Error in preparation of database for FMS			V		1	
27		Ground Navigational Aid failure			V			
28		Inadequate NOTAM information concerning ground navigational aid failure			V			
29		Inadequate navigational chart			V			
30		Cargo loading unsecured / shift		٧				
31		Midair collision		٧			1	
32		Collision with ground obstacle		٧				
33		Airspace infringement				٧		
34		Prolonged loss of communication (PLOC) between pilot and controller				٧		
35		Other cases of loss of separation				V	1	
36		Convective weather encounter in traffic intensive airport proximity				V		
37		System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System				٧		
38		In-flight smoke / fumes / fire (in cockpit, cabin, cargo) events that could affect the crew ability to conduct their duties and/or the aircraft controllability		V				
39		Hard landing		V			l	V
40		Engine stops during start or approach / landing		V			l	
41		Bounced landing		V				V
42		Deep (long) landing		V			l	V
43		AOA prevents missed approach		V			l	v
44		Turbulence encounter		V			<u> </u>	
45		Emergency landing					V	
46		Frontal surface encounter		V		\vdash	<u> </u>	<u> </u>
47		Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.				\vdash	V	<u> </u>
48		Natural or artificial obstacle on runway course			V		<u> </u>	
49		Landing gear retraction failure					V	
50		Engine failure				\vdash	V	



	Safety Performance	Ducasuracus		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
51		Cabin pressure drop as a result of pneumatic system failure					٧	
52		Risk of dangerous occurences appeared during take-off roll					٧	
53		Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll					٧	
54		Gross loading error		V				
55		Severe engine failure		٧				
56		Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown		V				٧
57		Crew incapacitation resulted from illness (e.g. food poisoning)		٧				
58		TCAS RA events (genuine or spurious)				٧		
59		Continued unstabilized approach (failure to comply with go-around criteria and policy)		٧				V
60		System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)		V				V
61		Severe failure of all engines on transoceanic route or over rarely populated area		V				
62		Missed approach execution necessary after prolonged flight due to e. g. extreme weather		V				V
63		Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate		V				٧
64		Convective weather - heavy rain resulted with wet RWY surface					٧	
65		Crew is incapable in result of shock related to hard landing		V				٧
66		Cabin pressure drop as a result of aircraft structural failure		V				
67		Crew is incapable in result of extreme turbulence		٧				
68		Engine suffers severe surge		V				
69		Failures affecting TCAS operation				V		
1	Rate of STCA warnings/flight	System failure affecting the operation of primary instruments / displays or standby instruments		٧	V	٧	V	V
2		Adverse weather / poor visibility conditions / darkness		٧	V	٧		٧
3		System failure affecting aircraft configuration, controllability and/or flying qualities		٧			٧	
4		Contaminated Runway		٧			٧	
5		Volcanic ash encounter		٧				
6		Convective weather / turbulence / windshear or crosswind conditions during take-off		٧			٧	٧
7		Convective weather encounter		V		٧		٧
8		Extreme turbulence encounter		V				
9		Wildlife incursion		V			٧	
10		Bird strike		٧			٧	
11		Windshear encounter		V				
12		Failures resulting in a non-standard fuel distribution		٧				†
13		Uncommanded thrust asymmetry		V				
14		Convective weather - heavy rain / hail resulted with engine compressor failure		٧				
15		Extreme icing conditions encounter		٧				
16		Fuel leak		V				
17		Inadequate fuel quality / type		V				



	Safety Performance	Discourage		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
18		Low-on-fuel condition / fuel starvation		V				
19		Tire burst		V				
20		Engine overheating		V				
21		Prolonged loss of communications (PLOC) between pilot and controller(s)			V		V	
22		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution		V				
23		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology		V				
24		Ground Navigational Aid failure			V			
25		Inadequate NOTAM information concerning ground navigational aid failure			V			
26		Inadequate navigational chart			V		' 	
27		Cargo loading unsecured / shift		٧				
28		GPWS / TAWS alert / warning (genuine or spurious)			V			
29		MSAW warning			V			
30		Error in preparation of database for FMS			V			
31		Midair collision		V				
32		Collision with ground obstacle		V				
33		Airspace infringement				٧		
34		Prolonged loss of communication (PLOC) between pilot and controller				٧		
35		Other cases of loss of separation				V		
36		Convective weather encounter in traffic intensive airport proximity				٧		
37		System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System				٧		
38		In-flight smoke / fumes / fire (in cockpit, cabin, cargo) events that could affect the crew ability to conduct their duties and/or		.,				
		the aircraft controllability		V				
39		Hard landing		V				٧
40		Engine stops during start or approach / landing		V				
41		Bounced landing		٧				V
42		Deep (long) landing		V				V
43		AOA prevents missed approach		٧				٧
44		Turbulence encounter		V				
45		Frontal surface encounter		٧				
46		Emergency landing					٧	
47		Gross loading error		V				
48		Natural or artificial obstacle on runway course			V			
49		Landing gear retraction failure					V	
50		Engine failure					٧	
51		Cabin pressure drop as a result of pneumatic system failure					٧	
52		Risk of dangerous occurences appeared during take-off roll					V	
53		Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll					٧	



	Safety Performance	Discourses		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
54		Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.					٧	
55		Severe engine failure		٧				
56		Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown		٧			' 	٧
57		Crew incapacitation resulted from illness (e.g. food poisoning)		٧				
58		TCAS RA events (genuine or spurious)				٧	' 	
59		Continued unstabilized approach (failure to comply with go-around criteria and policy)		V			' 	٧
60		System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)		٧				٧
61		Severe failure of all engines on transoceanic route or over rarely populated area		٧			' 	
62		Missed approach execution necessary after prolonged flight due to e. g. extreme weather		V				٧
63		Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate		V				٧
64		Convective weather - heavy rain resulted with wet RWY surface					٧	
65		Crew is incapable in result of shock related to hard landing		V				٧
66		Cabin pressure drop as a result of aircraft structural failure		V				
67		Crew is incapable in result of extreme turbulence		V				
68		Engine suffers severe surge		٧				
69		Failures affecting TCAS operation				٧		
1	Rate of EGPWS events/flight	System failure affecting the operation of primary instruments / displays or standby instruments		V	V		V	V
2	, 0	Adverse weather / poor visibility conditions / darkness		V	٧			V
3		Convective weather encounter		V				٧
4		Contaminated Runway		V			٧	
5		System failure affecting aircraft configuration, controllability and/or flying qualities		V			٧	
6		Volcanic ash encounter		٧				
7		Convective weather / turbulence / windshear or crosswind conditions during take-off		٧				V
8		Wildlife incursion		٧				
9		Failures resulting in a non-standard fuel distribution		V				
10		Uncommanded thrust asymmetry		٧				
11		Bird strike		٧				
12		Convective weather - heavy rain / hail resulted with engine compressor failure		V				
13		Extreme icing conditions encounter		٧				
14		Extreme turbulence encounter		٧				
15		Windshear encounter		٧				
16		Fuel leak		V				
17		Inadequate fuel quality / type		V				
18		Low-on-fuel condition / fuel starvation		٧				
19		Tire burst		V				
20		Engine overheating		٧				



	Safety Performance	Precursors		Ор	eration	al issu	e	
No.	Indicators	Trecursors	1	2	3	4	5	6
21		Prolonged loss of communications (PLOC) between pilot and controller(s)			V		٧	
22		GPWS / TAWS alert / warning (genuine or spurious)			V			
23		MSAW warning			V			
24		Ground Navigational Aid failure			V			
25		Inadequate NOTAM information concerning ground navigational aid failure			V			
26		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution		V				
27		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology		V				
28		Inadequate navigational chart			V			
29		Cargo loading unsecured / shift		٧				
30		Error in preparation of database for FMS			V			
31		Frontal surface encounter		V				V
32		Midair collision		٧				
33		Collision with ground obstacle		V				
34		Hard landing		V				V
35		Bounced landing		V				٧
36		Deep (long) landing		V				V
37		Engine stops during start or approach / landing		٧				
38		In-flight smoke / fumes / fire (in cockpit, cabin, cargo) events that could affect the crew ability to conduct their duties and/or		٧				
20		the aircraft controllability		.,				
39		AOA prevents missed approach		V				V
40		Convective weather / turbulence / windshear encounter conditions during landing	+					V
41		Gross loading error		V	.,		├─	₩
42		Natural or artificial obstacle on runway course	+		V		 	₩
43		Landing gear retraction failure					V	<u> </u>
44		Engine failure					V	-
45		Cabin pressure drop as a result of pneumatic system failure					V	—
46		Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll					V	<u> </u>
47		Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown		V			—	V
48		Severe engine failure		V			—	
49		Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly						V
50		System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)		V				V
51		Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate		٧				V
52		Crew incapacitation resulted from illness (e.g. food poisoning)		٧				
53		Continued unstabilized approach (failure to comply with go-around criteria and policy)		٧				٧
54		Severe failure of all engines on transoceanic route or over rarely populated area	1	٧				
55		Missed approach execution necessary after prolonged flight due to e. g. extreme weather		V				V



	Safety Performance	Precursors		Ор	eration	al issu	e	
No.	Indicators	Precuisors	1	2	3	4	5	6
56		Crew is incapable in result of shock related to hard landing		V				V
57		Crew is incapable in result of extreme turbulence		V				
58		Engine suffers severe surge		V				
59		Convective weather - heavy rain resulted with wet RWY surface					V	
1	Rate of incorrect flight crew	System failure affecting the operation of primary instruments / displays or standby instruments		V	V		V	v
	response to genuine EGPWS warnings/warning			V	V		v I	V
2		Convective weather encounter		V				V
3		Contaminated Runway		V			V	
4		Volcanic ash encounter		V				
5		System failure affecting aircraft configuration, controllability and/or flying qualities		V			V	
6		Wildlife incursion		V				
7		Failures resulting in a non-standard fuel distribution		٧				
8		Bird strike		V				
9		Extreme icing conditions encounter		٧				
10		Adverse weather / poor visibility conditions / darkness		V	V			
11		Extreme turbulence encounter		٧				
12		Convective weather - heavy rain / hail resulted with engine compressor failure		V				
13		Windshear encounter		V				
14		Fuel leak		V				
15		Low-on-fuel condition / fuel starvation		٧				
16		Tire burst		V				
17		Uncommanded thrust asymmetry		٧				
18		Inadequate fuel quality / type		٧				
19		Prolonged loss of communications (PLOC) between pilot and controller(s)			V		٧	
20		Engine overheating		٧				
21		GPWS / TAWS alert / warning (genuine or spurious)			V			
22		MSAW warning			V			
23		Ground Navigational Aid failure			V			
24		Inadequate NOTAM information concerning ground navigational aid failure			V			
25		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution		V				
26		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology		٧				
27		Error in preparation of database for FMS			V			
28		Inadequate navigational chart			V			
29		Cargo loading unsecured / shift		V				
30		Frontal surface encounter		٧				٧
31		Midair collision		٧			·	



	Safety Performance	Precursors		Op	Operational issue						
No.	Indicators	FIECUISOIS	1	2	3	4	5	6			
32		Collision with ground obstacle		٧							
33		Engine stops during start or approach / landing		٧							
34		In-flight smoke / fumes / fire (in cockpit, cabin, cargo) events that could affect the crew ability to conduct their duties and/or		V							
		the aircraft controllability		V							
35		Convective weather / turbulence / windshear encounter conditions during landing					· 	V			
36		Gross loading error		٧			· 				
37		Natural or artificial obstacle on runway course			V						
38		Landing gear retraction failure					V				
39		Engine failure					٧				
40		Cabin pressure drop as a result of pneumatic system failure					V				
41		Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll					V				
42		Bounced landing						V			
43		Convective weather / turbulence / windshear or crosswind conditions during take-off		V							
44		Hard landing						V			
45		Severe engine failure		٧							
46		Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly						V			
47		Crew incapacitation resulted from illness (e.g. food poisoning)		V							
48		Severe failure of all engines on transoceanic route or over rarely populated area		V							
49		Deep (long) landing						V			
50		System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)						V			
51		Crew is incapable in result of extreme turbulence		V							
52		Engine suffers severe surge		V							
53		Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate						V			
54		Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown						V			
55		Convective weather - heavy rain resulted with wet RWY surface					V				
1	Rate of navigational errors	System failure affecting the operation of primary instruments / displays or standby instruments					<u>-</u>				
	which result in a loss of separation with terrain/flight			٧	V		V	V			
2	corruin/ ingric	Adverse weather / poor visibility conditions / darkness		V	V			V			
3		Contaminated Runway		V	, v		V	, v			
4		System failure affecting aircraft configuration, controllability and/or flying qualities		V		-	V	\vdash			
5		Wildlife incursion		V			V				
6		Volcanic ash encounter		V		1		 			
7		Bird strike		V		1	V	 			
8		Convective weather / turbulence / windshear or crosswind conditions during take-off		V				V			



	Safety Performance	Precursors		Ор	eration	al issu	e	
No.	Indicators	FIECUISOIS	1	2	3	4	5	6
9		Tire burst		V			V	
10		Convective weather encounter		٧			1	٧
11		Extreme icing conditions encounter		V			٧	
12		Convective weather - heavy rain / hail resulted with engine compressor failure		٧			1	
13		Extreme turbulence encounter		V				
14		Failures resulting in a non-standard fuel distribution		V				
15		Uncommanded thrust asymmetry		V			1	
16		Fuel leak		V			1	
17		Windshear encounter		٧			l	
18		Low-on-fuel condition / fuel starvation		٧			1	
19		Inadequate fuel quality / type		٧			l	
20		Prolonged loss of communications (PLOC) between pilot and controller(s)			V		٧	
21		Engine overheating		٧			1	
22		GPWS / TAWS alert / warning (genuine or spurious)			V			
23		MSAW warning			V			
24		Ground Navigational Aid failure			V		l	
25		Inadequate NOTAM information concerning ground navigational aid failure			V			
26		Error in preparation of database for FMS			V			
27		Inadequate navigational chart			V		l	
28		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution		V			l	
29		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology		V			l	
30		Midair collision		٧			l	
31		Collision with ground obstacle		٧				
32		Cargo loading unsecured / shift		V				
33		Hard landing		٧				V
34		Bounced landing		V				V
35		Engine stops during start or approach / landing		٧				
36		In-flight smoke / fumes / fire (in cockpit, cabin, cargo) events that could affect the crew ability to conduct their duties and/or the aircraft controllability		V				
37		Deep (long) landing		V				V
38		AOA prevents missed approach		V				V
39		Continued unstabilized approach (failure to comply with go-around criteria and policy)		V			·	V
40		Contaminated wing		V			V	
41		Natural or artificial obstacle on runway course			V		í	
42		Landing gear retraction failure			-		V	
43		Engine failure					V	
44		Cabin pressure drop as a result of pneumatic system failure				1	V	



	Safety Performance	Precursors		Ор	eration	al issu	e	
No.	Indicators	riecuisois	1	2	3	4	5	6
45		Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll					V	
46		Cautions / warnings (genuine or spurious) that may lead to a low-speed or high-speed rejected take-off					V	
47		Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either						V
		intentionally or unknowingly					<u> </u>	V
48		Severe engine failure		V			ł	
49		Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate		V			V	٧
50		Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown		٧				V
51		Crew incapacitation resulted from illness (e.g. food poisoning)		V			ł	
52		System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)		٧				V
53		Severe failure of all engines on transoceanic route or over rarely populated area		>				
54		Missed approach execution necessary after prolonged flight due to e. g. extreme weather		٧			ł	٧
55		Convective weather - heavy rain resulted with wet RWY surface					٧	
56		Crew is incapable in result of shock related to hard landing		>				٧
57		Crew is incapable in result of extreme turbulence		٧				
58		Engine suffers severe surge		>				
1	Rate of MSAW	System failure affecting the operation of primary instruments / displays or standby instruments		V	V	V	V	V
	warnings/flight			V	٧	V		V
2		Adverse weather / poor visibility conditions / darkness		V	V	V	<u> </u>	V
3		Convective weather encounter		٧			<u> </u>	V
4		Contaminated Runway		V			V	<u> </u>
5		Volcanic ash encounter		V			<u> </u>	
6		Convective weather / turbulence / windshear or crosswind conditions during take-off		V			<u> </u>	V
7		System failure affecting aircraft configuration, controllability and/or flying qualities		V			V	
8		Wildlife incursion		V			<u> </u>	
9		Failures resulting in a non-standard fuel distribution		V			<u> </u>	
10		Bird strike		V			<u> </u>	
11		Extreme icing conditions encounter		V			<u> </u>	
12		Extreme turbulence encounter		٧			<u> </u>	
13		Convective weather - heavy rain / hail resulted with engine compressor failure		V			<u> </u>	
14		Windshear encounter		٧			i	
15		Fuel leak		٧			<u> </u>	
16		Low-on-fuel condition / fuel starvation		V				
17		Tire burst		V				
18		Uncommanded thrust asymmetry		V			<u> </u>	
19		Inadequate fuel quality / type		V				
20		Prolonged loss of communications (PLOC) between pilot and controller(s)			٧		V	
21		Engine overheating		V			i	



	Safety Performance	Precursors		Ор	eration	al issu	e	
No.	Indicators	T Tecursors	1	2	3	4	5	6
22		GPWS / TAWS alert / warning (genuine or spurious)			V		1	
23		MSAW warning			V			
24		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution		V			1	
25		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology		V				
26		Ground Navigational Aid failure			V			
27		Inadequate NOTAM information concerning ground navigational aid failure			V		1	
28		Error in preparation of database for FMS			V			
29		Inadequate navigational chart			V			
30		Cargo loading unsecured / shift		٧				
31		Frontal surface encounter		٧			1	٧
32		Midair collision		V			1	
33		Collision with ground obstacle		V				
34		Hard landing		V				V
35		Airspace infringement				V		
36		Other cases of loss of separation				٧		
37		Prolonged loss of communication (PLOC) between pilot and controller				V		
38		Convective weather encounter in traffic intensive airport proximity				V		
39		System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System				٧		
40		Bounced landing		V				V
41		Deep (long) landing		V				V
42		Engine stops during start or approach / landing		V				
43		In-flight smoke / fumes / fire (in cockpit, cabin, cargo) events that could affect the crew ability to conduct their duties and/or the aircraft controllability		٧				
44		AOA prevents missed approach		٧				V
45		Gross loading error		V			l	
46		Convective weather / turbulence / windshear encounter conditions during landing					l	V
47		Natural or artificial obstacle on runway course			V		l	
48		Landing gear retraction failure					V	†
49		Engine failure					V	
50		Cabin pressure drop as a result of pneumatic system failure					V	†
51		Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll					V	
52		Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown		V				V
53		Severe engine failure		V				
54		Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either	$\overline{}$	-				
		intentionally or unknowingly					ł	V
55		System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)		V				V
56		Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate		٧			1	V



	Safety Performance	Precursors		Ор	eration	al issu	e	
No.	Indicators	Precuisors	1	2	3	4	5	6
57		Crew incapacitation resulted from illness (e.g. food poisoning)		٧				
58		TCAS RA events (genuine or spurious)				٧		
59		Continued unstabilized approach (failure to comply with go-around criteria and policy)		٧				V
60		Severe failure of all engines on transoceanic route or over rarely populated area		٧				
61		Missed approach execution necessary after prolonged flight due to e. g. extreme weather		V				V
62		Crew is incapable in result of shock related to hard landing		V				V
63		Crew is incapable in result of extreme turbulence		٧				
64		Engine suffers severe surge		٧				
65		Failures affecting TCAS operation				٧		
66		Convective weather - heavy rain resulted with wet RWY surface					٧	
1	Rate of misuse of	Adverse weather / poor visibility conditions / darkness		.,				.,
	automation events/flight			V			1	V
2		Convective weather / turbulence / windshear or crosswind conditions during take-off		V				٧
3		System failure affecting the operation of primary instruments / displays or standby instruments		٧				٧
4		System failure affecting aircraft configuration, controllability and/or flying qualities		V				
5		Hard landing		٧				٧
6		Convective weather encounter		٧				٧
7		Bounced landing						٧
8		Deep (long) landing						٧
9		AOA prevents missed approach						٧
10		Extreme icing conditions encounter		٧				
11		Extreme turbulence encounter		٧				
12		Windshear encounter						
13		Turbulence encounter						
14		Frontal surface encounter						
15		Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either						T.,
		intentionally or unknowingly					1	V
16		Temporary loss of directional control during rollout						٧
17		Wildlife incursion						٧
18		Bird strike						٧
19		Contaminated Runway						V
20		Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown						V
21		Tire burst		٧		1		V
22		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution		V				V
23		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology						V
24		System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)						V
25		Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate						V



	Safety Performance	Drogueore		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
26		Continued unstabilized approach (failure to comply with go-around criteria and policy)		V				V
27		Missed approach execution necessary after prolonged flight due to e. g. extreme weather		V				V
28		Crew is incapable in result of shock related to hard landing						V
1	Rate of near-stall events/flight	System failure affecting the operation of primary instruments / displays or standby instruments		٧			٧	
2		System failure affecting aircraft configuration, controllability and/or flying qualities		V			٧	
3		Extreme icing conditions encounter		٧			V	
4		Convective weather encounter		٧				V
5		Contaminated Runway		V			V	
6		Bird strike		V			V	
7		Extreme turbulence encounter		٧				
8		Tire burst		V			٧	
9		Volcanic ash encounter		V				
10		Uncommanded thrust asymmetry		٧				
11		Wildlife incursion		V			V	
12		Windshear encounter		V				
13		Adverse weather / poor visibility conditions / darkness		٧				V
14		Failures resulting in a non-standard fuel distribution		٧				
15		Convective weather - heavy rain / hail resulted with engine compressor failure		٧				
16		Fuel leak		V				
17		Inadequate fuel quality / type		٧				
18		Low-on-fuel condition / fuel starvation		٧				
19		Engine overheating		V				
20		Convective weather / turbulence / windshear or crosswind conditions during take-off		V				V
21		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution		٧				
22		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology		V				
23		Hard landing		V				V
24		Bounced landing		٧				V
25		Engine stops during start or approach / landing		٧				
26		Deep (long) landing		V				٧
27		Turbulence encounter		٧				
28		Frontal surface encounter		٧				
29		Contaminated wing		٧			V	
30		Gross loading error		٧				
31		Cargo loading unsecured / shift		٧			·	
32		Landing gear retraction failure					V	
33		Engine failure					V	



	Safety Performance	Discourage		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
34		Cabin pressure drop as a result of pneumatic system failure					V	
35		inadequate anti-ice fluid holdover Time (HOT)		V				
36		Extreme icing condition and / or heavy snow. Break in airport operation due to adverse weather or / and necessity of RWY surface maintenance.		V				
37		Prolonged loss of communications (PLOC) between pilot and controller(s)					٧	
38		Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll					٧	
39		In-flight smoke / fumes / fire (in cockpit, cabin, cargo) events that could affect the crew ability to conduct their duties and/or the aircraft controllability		V				
40		Cautions / warnings (genuine or spurious) that may lead to a low-speed or high-speed rejected take-off					V	
41		Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly						٧
42		Continued unstabilized approach (failure to comply with go-around criteria and policy)						٧
43		Severe engine failure		V				
44		Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate		V			٧	٧
45		Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown		V				V
46		Crew incapacitation resulted from illness (e.g. food poisoning)		V				
47		System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)		V				V
48		Severe failure of all engines on transoceanic route or over rarely populated area		V				
49		Convective weather - heavy rain resulted with wet RWY surface					V	
50		Crew is incapable in result of shock related to hard landing		V				V
51		Cabin pressure drop as a result of aircraft structural failure		V				
52		Crew is incapable in result of extreme turbulence		V				
53		Engine suffers severe surge		V				
1	Rate of high bank angle events/flight	System failure affecting the operation of primary instruments / displays or standby instruments		٧			٧	٧
2		System failure affecting aircraft configuration, controllability and/or flying qualities		V			V	
3		Convective weather / turbulence / windshear or crosswind conditions during take-off		V			٧	V
4		Adverse weather / poor visibility conditions / darkness		V				٧
5		Extreme icing conditions encounter		V				
6		Convective weather encounter		V				V
7		Volcanic ash encounter		V				
8		Uncommanded thrust asymmetry		٧				
9		Contaminated Runway		V			V	
10		Extreme turbulence encounter		٧				
11		Windshear encounter		٧				
12		Bird strike		V			V	
13		Failures resulting in a non-standard fuel distribution		V				



	Safety Performance	Precursors		Ор	eration	al issu	e	
No.	Indicators	Precuisors	1	2	3	4	5	6
14		Wildlife incursion		V			V	
15		Convective weather - heavy rain / hail resulted with engine compressor failure		V				
16		Fuel leak		٧			1	
17		Inadequate fuel quality / type		V				
18		Low-on-fuel condition / fuel starvation		٧				
19		Tire burst		٧				
20		Engine overheating		٧				
21		Hard landing		٧				٧
22		Bounced landing		V			1	V
23		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution		V			1	
24		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology		V				
25		Engine stops during start or approach / landing		V			1	
26		Deep (long) landing		V				٧
27		AOA prevents missed approach		V			1	V
28		Gross loading error		V				
29		Cargo loading unsecured / shift		V				
30		Turbulence encounter		V			1	
31		Landing gear retraction failure					V	
32		Frontal surface encounter		V				
33		Emergency landing					٧	
34		Continued unstabilized approach (failure to comply with go-around criteria and policy)		V			1	V
35		Prolonged loss of communications (PLOC) between pilot and controller(s)					V	
36		Engine failure					V	
37		Cabin pressure drop as a result of pneumatic system failure					٧	
38		Risk of dangerous occurences appeared during take-off roll					V	
39		Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll					٧	
40		Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.					V	
41		Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly						٧
42		Severe engine failure		V				
43		Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown	+	V			1	V
44		System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)		V				V
45		Severe failure of all engines on transoceanic route or over rarely populated area	1	V			<u> </u>	
46		Missed approach execution necessary after prolonged flight due to e. g. extreme weather	+	V			1	V
47		Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate	1	V			<u> </u>	V
48		Convective weather - heavy rain resulted with wet RWY surface	1				V	
49		Crew is incapable in result of shock related to hard landing	+	V			1	V



	Safety Performance	Precursors		Ор	eration	al issu	e	
No.	Indicators	Precuisors	1	2	3	4	5	6
50		Crew is incapable in result of extreme turbulence		V				
51		Engine suffers severe surge		V				
1	Rate of runway incursion events/flight	Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	V	V				
2		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	V	V			' 	
3		Adverse weather / poor visibility conditions / darkness	V	V				
4		Contaminated Runway		V			V	
5		Emergency landing	V				V	
6		Midair collision		V				
7		Collision with ground obstacle		٧				
8		Wildlife incursion		V			V	
9		Cargo loading unsecured / shift		V				
10		Volcanic ash encounter		V				
11		Runway confusion	V					
12		Taxiway confusion	V					
13		Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWY.	V					
14		In-flight smoke / fumes / fire (in cockpit, cabin, cargo) events that could affect the crew ability to conduct their duties and/or the aircraft controllability		V				
15		System failure affecting aircraft configuration, controllability and/or flying qualities		V			٧	
16		Bird strike		V			V	
17		System failure affecting the operation of primary instruments / displays or standby instruments		V			٧	
18		Prolonged loss of communications (PLOC) between pilot and controller(s)					V	
19		Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll					٧	
20		Convective weather / turbulence / windshear or crosswind conditions during take-off					٧	
21		Landing gear retraction failure					V	
22		Engine failure					٧	
23		Cabin pressure drop as a result of pneumatic system failure					٧	
24		Risk of dangerous occurences appeared during take-off roll					٧	
25		Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.					٧	
26		Extreme turbulence encounter		V				
27		Crew incapacitation resulted from illness (e.g. food poisoning)		V				
28		Convective weather - heavy rain resulted with wet RWY surface					V	
1	Rate of ground movement errors/flight	Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	V	V				
2		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	٧	٧			·	
3		Adverse weather / poor visibility conditions / darkness	V	٧				
4		Emergency landing	V				V	



	Safety Performance	D		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
5		Contaminated Runway		V			V	l
6		Midair collision		V				
7		Collision with ground obstacle		V				
8		Wildlife incursion		V			٧	
9		Cargo loading unsecured / shift		V				
10		Volcanic ash encounter		V				
11		Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	V				٧	
12		Runway confusion	V					1
13		Taxiway confusion	V					i
14		Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWY.	V					
15		Flaws in ground equipment maintenance process	V					1
16		Taxiway incursion	V					1
17		In-flight smoke / fumes / fire (in cockpit, cabin, cargo) events that could affect the crew ability to conduct their duties and/or		V				1
		the aircraft controllability		V				
18		Bird strike		V			V	l
19		Lack of adherence to SOP for GND movements in terms of marshalling procedure	V					
20		Stand confusion	V					
21		Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure)	V					l
22		Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication.	V					
23		Convective weather / turbulence / windshear or crosswind conditions during take-off					٧	
24		Risk of dangerous occurences appeared during take-off roll					٧	
25		System failure affecting aircraft configuration, controllability and/or flying qualities		V			٧	ł
26		Extreme turbulence encounter		V				
27		System failure affecting the operation of primary instruments / displays or standby instruments		V				i
28		Crew incapacitation resulted from illness (e.g. food poisoning)		V				
29		Convective weather - heavy rain resulted with wet RWY surface					٧	1



	Safety Performance	Ducasinosus		Op									
No.	Indicators	Precursors	1	2	3	4	5	6					
	SYSTEM OF ORGANISATIONS	Occurrences: Uneventful events	GCOL	LOC-I	CFIT	MAC	RE-TO	RE-L					
1	System combined runway incursion rate	Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	٧	٧									
2		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	V	V									
3		Adverse weather / poor visibility conditions / darkness	V	V									
4		Contaminated Runway		V			V						
5		Emergency landing	V				V						
6		Midair collision		V									
7		Collision with ground obstacle		V									
8		Wildlife incursion		V			V						
9		Cargo loading unsecured / shift		V									
10		Volcanic ash encounter		V									
11		Runway confusion	V										
12		Taxiway confusion	V										
13		Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWY.	V										
14		In-flight smoke / fumes / fire (in cockpit, cabin, cargo) events that could affect the crew ability to conduct their duties and/or the aircraft controllability		٧									
15		System failure affecting aircraft configuration, controllability and/or flying qualities		٧			V						
16		Bird strike		V			V						
17		System failure affecting the operation of primary instruments / displays or standby instruments		٧			V						
18		Prolonged loss of communications (PLOC) between pilot and controller(s)					V						
19		Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll					V						
20		Convective weather / turbulence / windshear or crosswind conditions during take-off					٧						
21		Landing gear retraction failure					V						
22		Engine failure					٧						
23		Cabin pressure drop as a result of pneumatic system failure					٧						
24		Risk of dangerous occurences appeared during take-off roll					٧						



	Safety Performance	Ducasiyaaya		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
25		Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.					٧	
26		Extreme turbulence encounter		V				
27		Crew incapacitation resulted from illness (e.g. food poisoning)		V				
28		Convective weather - heavy rain resulted with wet RWY surface					V	
1	System combined taxiway incursion rate	Adverse weather / poor visibility conditions / darkness	V	V				
2		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	V	V				
3		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	V	V				
4		Flaws in ground equipment maintenance process	V					
5		Runway confusion	V					
6		Taxiway confusion	V					
7		Emergency landing	V					
8		Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWY.	V					
9		Taxiway incursion	V					
10		Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	V					
11		Lack of adherence to SOP for GND movements in terms of marshalling procedure	V					
12		Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure)	V					
13		Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication.	V					
14		Stand confusion	V					
15		Extreme turbulence encounter		V				
16		System failure affecting aircraft configuration, controllability and/or flying qualities		V				
17		System failure affecting the operation of primary instruments / displays or standby instruments		V				
18		In-flight smoke / fumes / fire (in cockpit, cabin, cargo) events that could affect the crew ability to conduct their duties and/or the aircraft controllability		V				
19		Bird strike		V				
20		Crew incapacitation resulted from illness (e.g. food poisoning)		V				
1	System combined airprox rate	System failure affecting the operation of primary instruments / displays or standby instruments		V		٧	V	V
2		System failure affecting aircraft configuration, controllability and/or flying qualities		٧			V	
3		Adverse weather / poor visibility conditions / darkness	V	V		V		٧



	Safety Performance	Discourage		Ор	eration	al issu	<u></u>	
No.	Indicators	Precursors	1	2	3	4	5	6
4		Convective weather / turbulence / windshear or crosswind conditions during take-off		V			V	V
5		Convective weather encounter		V		V		V
6		Extreme turbulence encounter		٧			1	
7		Bird strike		٧			V	
8		Contaminated Runway		V			V	
9		Windshear encounter		V			1	
10		Failures resulting in a non-standard fuel distribution		٧				
11		Uncommanded thrust asymmetry		٧				
12		Convective weather - heavy rain / hail resulted with engine compressor failure		٧				
13		Extreme icing conditions encounter		٧				
14		Volcanic ash encounter		٧				
15		Wildlife incursion		٧			V	
16		Fuel leak		٧				
17		Inadequate fuel quality / type		٧				
18		Low-on-fuel condition / fuel starvation		V				
19		Tire burst		V				
20		Engine overheating		V			1	
21		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	V	V			1	
22		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	V	V				
23		Emergency landing	V				V	
24		Airspace infringement				V	1	
25		Prolonged loss of communication (PLOC) between pilot and controller				V		
26		Other cases of loss of separation				V		
27		Convective weather encounter in traffic intensive airport proximity				V		
28		System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System				٧		
29		Hard landing		٧				٧
30		Runway confusion	٧				1	
31		Engine stops during start or approach / landing		٧			-	



	Safety Performance	December		Ор	eration	al issu	<u> </u>	
No.	Indicators	Precursors	1	2	3	4	5	6
32		Taxiway confusion	V					
33		Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWY.	V					
34		Bounced landing		V				V
35		Deep (long) landing		V				V
36		AOA prevents missed approach		V				V
37		Turbulence encounter		٧				
38		Frontal surface encounter		٧				
39		Cargo loading unsecured / shift		V				
40		Prolonged loss of communications (PLOC) between pilot and controller(s)					V	
41		Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll					V	
42		Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.					V	
43		Gross loading error		V				
44		Landing gear retraction failure					V	
45		Engine failure					٧	
46		Cabin pressure drop as a result of pneumatic system failure					V	
47		Risk of dangerous occurences appeared during take-off roll					V	
48		In-flight smoke / fumes / fire (in cockpit, cabin, cargo) events that could affect the crew ability to conduct their duties and/or the aircraft controllability		٧				
49		Severe engine failure		V				
50		Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown		V				V
51		Crew incapacitation resulted from illness (e.g. food poisoning)		V				
52		TCAS RA events (genuine or spurious)				V		
53		Continued unstabilized approach (failure to comply with go-around criteria and policy)		٧				٧
54		System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)		V				٧
55		Severe failure of all engines on transoceanic route or over rarely populated area		V				
56		Missed approach execution necessary after prolonged flight due to e. g. extreme weather		٧				٧
57		Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate		٧				٧
58		Convective weather - heavy rain resulted with wet RWY surface					٧	
59		Crew is incapable in result of shock related to hard landing		V				V



	Safety Performance	Discourage.		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
60		Cabin pressure drop as a result of aircraft structural failure		٧			1	
61		Crew is incapable in result of extreme turbulence		V				
62		Engine suffers severe surge		V			1	
63		Failures affecting TCAS operation				V	1	
1	Operator combined erroneous weather prediction rate	Adverse weather / poor visibility conditions / darkness	V	V	V	V		V
2		System failure affecting the operation of primary instruments / displays or standby instruments		V	٧	V	V	V
3		Convective weather encounter		٧		٧	1	V
4		Convective weather / turbulence / windshear or crosswind conditions during take-off		V			V	V
5		Extreme icing conditions encounter		V			V	
6		System failure affecting aircraft configuration, controllability and/or flying qualities		V			V	
7		Extreme turbulence encounter		V			1	
8		Windshear encounter		V				
9		Bird strike		V			V	
10		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	V	V			1	
11		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	V	V				
12		Volcanic ash encounter		V			 	
13		Contaminated Runway		V			V	
14		Convective weather - heavy rain / hail resulted with engine compressor failure		V			 	
15		Wildlife incursion		V			V	
16		Fuel leak		V			1	
17		Failures resulting in a non-standard fuel distribution		V			1	
18		Tire burst		V			1	
19		Uncommanded thrust asymmetry		V			 	
20		Inadequate fuel quality / type		٧				
21		Low-on-fuel condition / fuel starvation		٧				
22		Frontal surface encounter		V			1	٧
23		Engine overheating		٧				



	Safety Performance	Drawware		Ор	eration	al issu	e	-
No.	Indicators	Precursors	1	2	3	4	5	6
24		GPWS / TAWS alert / warning (genuine or spurious)			V			
25		MSAW warning			V			
26		Prolonged loss of communications (PLOC) between pilot and controller(s)			٧			
27		Error in preparation of database for FMS			V			
28		Ground Navigational Aid failure			V			
29		Inadequate NOTAM information concerning ground navigational aid failure			V			
30		Inadequate navigational chart			V			
31		Hard landing		V				٧
32		Bounced landing		V				٧
33		Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate		V			V	٧
34		Emergency landing	V				٧	
35		Convective weather encounter in traffic intensive airport proximity				V		
36		Airspace infringement				V		
37		Other cases of loss of separation				V		
38		Prolonged loss of communication (PLOC) between pilot and controller				V		
39		System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System				V		
40		Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly						٧
41		Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	V				٧	
42		Deep (long) landing		٧				٧
43		Runway confusion	V					
44		Engine stops during start or approach / landing		V				
45		Taxiway confusion	V					
46		Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWY.	V					
47		Taxiway incursion	V					
48		AOA prevents missed approach		٧				٧
49		Flaws in ground equipment maintenance process	V					
50		Turbulence encounter		٧				
51		Lack of adherence to SOP for GND movements in terms of marshalling procedure	V				·	



	Safety Performance	Disamusa a		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
52		Stand confusion	٧					
53		Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure)	٧					
54		Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication.	٧					-
55		Contaminated wing		V			٧	
56		Continued unstabilized approach (failure to comply with go-around criteria and policy)		V				V
57		Convective weather / turbulence / windshear encounter conditions during landing						٧
58		inadequate anti-ice fluid holdover Time (HOT)		V				
59		Extreme icing condition and / or heavy snow. Break in airport operation due to adverse weather or / and necessity of RWY surface maintenance.		٧				
60		Natural or artificial obstacle on runway course			V			1
61		Risk of dangerous occurences appeared during take-off roll					V	
62		Temporary loss of directional control during rollout						V
63		Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown		V				V
64		System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)		V				٧
65		Severe engine failure		V				
66		In-flight smoke / fumes / fire (in cockpit, cabin, cargo) events that could affect the crew ability to conduct their duties and/or the aircraft controllability		٧				
67		Crew incapacitation resulted from illness (e.g. food poisoning)		V				
68		TCAS RA events (genuine or spurious)				٧		
69		Severe failure of all engines on transoceanic route or over rarely populated area		V				
70		Missed approach execution necessary after prolonged flight due to e. g. extreme weather		V				٧
71		Convective weather - heavy rain resulted with wet RWY surface					٧	
72		Crew is incapable in result of shock related to hard landing		V				٧
73		Crew is incapable in result of extreme turbulence		V				
74		Engine suffers severe surge		V				
75		Cautions / warnings (genuine or spurious) that may lead to a low-speed or high-speed rejected take-off					٧	
76		Failures affecting TCAS operation				V		
1	System combined bird strike rate	Bird strike		٧			٧	٧
2		Contaminated Runway		V			٧	V



	Safety Performance	Precursors		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
3		System failure affecting the operation of primary instruments / displays or standby instruments		V			V	V
4		Wildlife incursion		V			V	V
5		Tire burst		V			V	V
6		System failure affecting aircraft configuration, controllability and/or flying qualities		V			V	
7		Convective weather encounter		V				
8		Extreme turbulence encounter		V				
9		Volcanic ash encounter		V				
10		Convective weather - heavy rain / hail resulted with engine compressor failure		٧				
11		Fuel leak		V				-
12		Extreme icing conditions encounter		٧				
13		Windshear encounter		V				-
14		Uncommanded thrust asymmetry		V				-
15		Failures resulting in a non-standard fuel distribution		V				
16		Inadequate fuel quality / type		V				
17		Low-on-fuel condition / fuel starvation		V				
18		Engine overheating		V				
19		Engine stops during start or approach / landing		V				
20		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution		V				٧
21		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology		٧				٧
22		Emergency landing					٧	
23		Convective weather / turbulence / windshear or crosswind conditions during take-off					V	
24		Risk of dangerous occurences appeared during take-off roll					٧	
25		Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.					V	
26		Severe engine failure		V				
27		Adverse weather / poor visibility conditions / darkness		٧				
28		In-flight smoke / fumes / fire (in cockpit, cabin, cargo) events that could affect the crew ability to conduct their duties and/or the aircraft controllability		٧				
29		Crew incapacitation resulted from illness (e.g. food poisoning)		٧				
30		Severe failure of all engines on transoceanic route or over rarely populated area		V				



	Safety Performance	Draguesara		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
31		Convective weather - heavy rain resulted with wet RWY surface					٧	
32		Crew is incapable in result of extreme turbulence		V				
33		Engine suffers severe surge		V				
1	Total number of formal safety related meetings involving at least to different type of organisations (e.g. an aerodrome and ANSP) per year	System failure affecting the operation of primary instruments / displays or standby instruments		V	V	V	V	V
2		Adverse weather / poor visibility conditions / darkness	V	V	V	V		V
3		System failure affecting aircraft configuration, controllability and/or flying qualities		V			٧	
4		Convective weather encounter		V		V		V
5		Contaminated Runway		V			٧	V
6		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	V	V				V
7		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	V	V				V
8		Convective weather / turbulence / windshear or crosswind conditions during take-off		V			٧	V
9		Tire burst		V			٧	V
10		Wildlife incursion		V			٧	٧
11		Bird strike		V			٧	V
12		Extreme icing conditions encounter		V			٧	
13		Volcanic ash encounter		V				
14		Extreme turbulence encounter		V				
15		Windshear encounter		V				
16		Uncommanded thrust asymmetry		V				
17		Failures resulting in a non-standard fuel distribution		V				
18		Convective weather - heavy rain / hail resulted with engine compressor failure		V				
19		Fuel leak		٧				
20		Inadequate fuel quality / type		V				
21		Low-on-fuel condition / fuel starvation		V				



	Safety Performance	Draguesara		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
22		Engine overheating		V			1	
23		Prolonged loss of communications (PLOC) between pilot and controller(s)			V		V	
24		Frontal surface encounter		V			- 	٧
25		GPWS / TAWS alert / warning (genuine or spurious)			V			
26		MSAW warning			V			
27		Cargo loading unsecured / shift		V				
28		Ground Navigational Aid failure			V			
29		Inadequate NOTAM information concerning ground navigational aid failure			V			
30		Error in preparation of database for FMS			V			
31		Inadequate navigational chart			٧		- 	
32		Hard landing		V				٧
33		Emergency landing	V				٧	
34		Bounced landing		V			- 	V
35		Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate		V			V	V
36		Midair collision		V				
37		Collision with ground obstacle		V				
38		Airspace infringement				V	- 	
39		Prolonged loss of communication (PLOC) between pilot and controller				V		
40		Other cases of loss of separation				V		
41		Convective weather encounter in traffic intensive airport proximity				V		
42		System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System				V	- 	
43		Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	V				V	
44		Runway confusion	V					
45		Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly						V
46		Taxiway confusion	V					
47		In-flight smoke / fumes / fire (in cockpit, cabin, cargo) events that could affect the crew ability to conduct their duties and/or the aircraft controllability		٧				
48		Deep (long) landing		V				V



	Safety Performance	Processor		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
49		Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWY.	V					
50		Flaws in ground equipment maintenance process	V					
51		Engine stops during start or approach / landing		V				
52		Taxiway incursion	V					
53		AOA prevents missed approach		V				V
54		Lack of adherence to SOP for GND movements in terms of marshalling procedure	V					
55		Stand confusion	V					
56		Turbulence encounter		V				
57		Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure)	V					
58		Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication.	V					
59		Landing gear retraction failure					V	
60		Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll					V	
61		Contaminated wing		V			٧	
62		Continued unstabilized approach (failure to comply with go-around criteria and policy)		V				V
63		Gross loading error		V				
64		Convective weather / turbulence / windshear encounter conditions during landing						V
65		Engine failure					٧	
66		Cabin pressure drop as a result of pneumatic system failure					V	
67		Risk of dangerous occurences appeared during take-off roll					٧	
68		inadequate anti-ice fluid holdover Time (HOT)		V				
69		Extreme icing condition and / or heavy snow. Break in airport operation due to adverse weather or / and necessity of RWY surface maintenance.		V				
70		Natural or artificial obstacle on runway course			V			
71		Convective weather - heavy rain resulted with wet RWY surface					V	
72		Temporary loss of directional control during rollout						V
73		Cautions / warnings (genuine or spurious) that may lead to a low-speed or high-speed rejected take-off					٧	
74		Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown		٧				V
75		System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)		V				٧
76		Severe engine failure		V				



	Safety Performance	Dan salara da	Τ	Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
77		Crew incapacitation resulted from illness (e.g. food poisoning)		V				
78		TCAS RA events (genuine or spurious)				٧		
79		Severe failure of all engines on transoceanic route or over rarely populated area		V				
80		Missed approach execution necessary after prolonged flight due to e. g. extreme weather		V				V
81		Crew is incapable in result of shock related to hard landing		V				V
82		Cabin pressure drop as a result of aircraft structural failure		V				
83		Crew is incapable in result of extreme turbulence		V				
84		Engine suffers severe surge		V				
85		Failures affecting TCAS operation				V		
1	Total number of formal meetings of network of analysts to discuss safety performance measurement	System failure affecting the operation of primary instruments / displays or standby instruments		٧	V	٧	V	V
2		Adverse weather / poor visibility conditions / darkness	V	V	V	V		V
3		System failure affecting aircraft configuration, controllability and/or flying qualities		٧			٧	
4		Convective weather encounter		V		V		٧
5		Contaminated Runway		٧			V	٧
6		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	V	V				٧
7		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	V	V				٧
8		Convective weather / turbulence / windshear or crosswind conditions during take-off		V			V	V
9		Tire burst		V			V	٧
10		Wildlife incursion		V			V	V
11		Bird strike		V			V	V
12		Extreme icing conditions encounter		V			V	
13		Volcanic ash encounter		V				
14		Extreme turbulence encounter		V				
15		Windshear encounter		٧				
16		Uncommanded thrust asymmetry		٧				
17		Failures resulting in a non-standard fuel distribution		V				



	Safety Performance	Para surressure		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
18		Convective weather - heavy rain / hail resulted with engine compressor failure		V				
19		Fuel leak		V				
20		Inadequate fuel quality / type		V				
21		Low-on-fuel condition / fuel starvation		V				
22		Engine overheating		V				
23		Prolonged loss of communications (PLOC) between pilot and controller(s)			V		٧	
24		Frontal surface encounter		V				٧
25		GPWS / TAWS alert / warning (genuine or spurious)			V			
26		MSAW warning			V		1	
27		Cargo loading unsecured / shift		V			1	
28		Ground Navigational Aid failure			V		1	
29		Inadequate NOTAM information concerning ground navigational aid failure			V			
30		Error in preparation of database for FMS			V		1	
31		Inadequate navigational chart			V		1	
32		Hard landing		V				٧
33		Emergency landing	V				V	
34		Bounced landing		V				٧
35		Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate		V			V	٧
36		Midair collision		V				
37		Collision with ground obstacle		V				
38		Airspace infringement				V	1	
39		Prolonged loss of communication (PLOC) between pilot and controller				V	1	
40		Other cases of loss of separation				V		
41		Convective weather encounter in traffic intensive airport proximity				V	1	
42		System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System				V		
43		Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	V				٧	
44		Runway confusion	V					
45		Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly						٧



	Safety Performance	Draguesara		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
46		Taxiway confusion	V					
47		In-flight smoke / fumes / fire (in cockpit, cabin, cargo) events that could affect the crew ability to conduct their duties and/or the aircraft controllability		V				
48		Deep (long) landing		V				V
49		Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWY.	V					
50		Flaws in ground equipment maintenance process	V					
51		Engine stops during start or approach / landing		V				
52		Taxiway incursion	V					
53		AOA prevents missed approach		V				V
54		Lack of adherence to SOP for GND movements in terms of marshalling procedure	V					
55		Stand confusion	V					
56		Turbulence encounter		V				
57		Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure)	V					
58		Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication.	V					
59		Landing gear retraction failure					٧	
60		Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll					٧	
61		Contaminated wing		V			٧	
62		Continued unstabilized approach (failure to comply with go-around criteria and policy)		V				٧
63		Gross loading error		V				
64		Convective weather / turbulence / windshear encounter conditions during landing						٧
65		Engine failure					٧	
66		Cabin pressure drop as a result of pneumatic system failure					٧	
67		inadequate anti-ice fluid holdover Time (HOT)		V				
68		Extreme icing condition and / or heavy snow. Break in airport operation due to adverse weather or / and necessity of RWY surface maintenance.		V				
69		Natural or artificial obstacle on runway course			V			
70		Convective weather - heavy rain resulted with wet RWY surface					٧	
71		Risk of dangerous occurences appeared during take-off roll					V	
72		Temporary loss of directional control during rollout						٧



	Safety Performance	Draguesara		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
73		Cautions / warnings (genuine or spurious) that may lead to a low-speed or high-speed rejected take-off					V	
74		Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown		V				V
75		System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)		V				V
76		Severe engine failure		V				
77		Crew incapacitation resulted from illness (e.g. food poisoning)		V				
78		TCAS RA events (genuine or spurious)				٧		
79		Severe failure of all engines on transoceanic route or over rarely populated area		V				
80		Missed approach execution necessary after prolonged flight due to e. g. extreme weather		V				٧
81		Crew is incapable in result of shock related to hard landing		V				٧
82		Cabin pressure drop as a result of aircraft structural failure		V				
83		Crew is incapable in result of extreme turbulence		V				
84		Engine suffers severe surge		V				
85		Failures affecting TCAS operation				V		
1	The safety impact of each significant airport infrastructural change is assessed and deemed acceptable before the actual introduction of the change	Adverse weather / poor visibility conditions / darkness	V	V	V	>		>
2		Convective weather / turbulence / windshear or crosswind conditions during take-off		V			V	٧
3		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	V	V				V
4		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	٧	V				٧
5		System failure affecting the operation of primary instruments / displays or standby instruments		V	V	V		V
6		Contaminated Runway		V			V	V
7		Ground Navigational Aid failure			V			
8		Inadequate NOTAM information concerning ground navigational aid failure			V			
9		GPWS / TAWS alert / warning (genuine or spurious)			V			
10		MSAW warning			V			
11		Prolonged loss of communications (PLOC) between pilot and controller(s)			V			



	Safety Performance	Data sussession of the state of		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
12		Error in preparation of database for FMS			V		1	
13		Inadequate navigational chart			V		1	
14		Cargo loading unsecured / shift		٧				
15		Midair collision		V			1	
16		Collision with ground obstacle		V			1	
17		Volcanic ash encounter		٧				
18		Wildlife incursion		V			1	V
19		Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate		V			V	V
20		Airspace infringement				V		
21		Other cases of loss of separation				V	1	
22		Prolonged loss of communication (PLOC) between pilot and controller				V		
23		Convective weather encounter in traffic intensive airport proximity				V		
24		System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System				V		
25		Runway confusion	V					
26		Taxiway confusion	V					
27		Hard landing		٧				٧
28		Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWY.	V				1	
29		Emergency landing	V					
30		In-flight smoke / fumes / fire (in cockpit, cabin, cargo) events that could affect the crew ability to conduct their duties and/or the aircraft controllability		٧				
31		Bounced landing		V			1	V
32		Deep (long) landing		V				V
33		Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	V					
34		Taxiway incursion	V					
35		AOA prevents missed approach		V				V
36		Lack of adherence to SOP for GND movements in terms of marshalling procedure	V					
37		Flaws in ground equipment maintenance process	V					
38		Stand confusion	V					
39		Bird strike		٧				٧



	Safety Performance	Discourage		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
40		Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure)	٧					
41		Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication.	٧					
42		Gross loading error		V				
43		Natural or artificial obstacle on runway course			V			
44		Tire burst						٧
45		Failures resulting in a non-standard fuel distribution		V				
46		System failure affecting aircraft configuration, controllability and/or flying qualities		V			٧	
47		Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown		V				V
48		Convective weather encounter		V				V
49		Extreme turbulence encounter		V				
50		Crew incapacitation resulted from illness (e.g. food poisoning)		V				
51		TCAS RA events (genuine or spurious)				V		
52		Continued unstabilized approach (failure to comply with go-around criteria and policy)		V				V
53		System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)		V				V
54		Missed approach execution necessary after prolonged flight due to e. g. extreme weather		V				٧
55		Crew is incapable in result of shock related to hard landing		V				٧
56		Failures affecting TCAS operation				V		
57		Convective weather - heavy rain resulted with wet RWY surface					V	
58		Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly						٧
59		Temporary loss of directional control during rollout						V
1	The actual safety impact of each significant airport infrastructural change is evaluated at most after 3 years of implementation of the change	Adverse weather / poor visibility conditions / darkness	V	V	V	V		V
2		Convective weather / turbulence / windshear or crosswind conditions during take-off		V			٧	V
3		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	V	V				V
4		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	٧	V				٧



	Safety Performance	Ducasinosus		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
5		System failure affecting the operation of primary instruments / displays or standby instruments		٧	V	٧		V
6		Contaminated Runway		V			V	V
7		Ground Navigational Aid failure			V			
8		Inadequate NOTAM information concerning ground navigational aid failure			V			
9		GPWS / TAWS alert / warning (genuine or spurious)			V			
10		MSAW warning			V			
11		Prolonged loss of communications (PLOC) between pilot and controller(s)			V			
12		Error in preparation of database for FMS			V			
13		Inadequate navigational chart			V			
14		Cargo loading unsecured / shift		V				
15		Midair collision		V				
16		Collision with ground obstacle		V				
17		Volcanic ash encounter		V				
18		Wildlife incursion		V				V
19		Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate		V			٧	٧
20		Airspace infringement				V		
21		Other cases of loss of separation				V		
22		Prolonged loss of communication (PLOC) between pilot and controller				V		
23		Convective weather encounter in traffic intensive airport proximity				V		
24		System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System				V		
25		Runway confusion	V					
26		Taxiway confusion	٧					
27		Hard landing		V				V
28		Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWY.	٧					
29		Emergency landing	٧					
30		In-flight smoke / fumes / fire (in cockpit, cabin, cargo) events that could affect the crew ability to conduct their duties and/or the aircraft controllability		٧	_			
31		Bounced landing		V				V
32		Deep (long) landing		V			_ 	V



	Safety Performance	Draguesas		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
33		Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	V				1	
34		Taxiway incursion	V					
35		AOA prevents missed approach		V				٧
36		Lack of adherence to SOP for GND movements in terms of marshalling procedure	V					
37		Flaws in ground equipment maintenance process	V					
38		Stand confusion	V				- 	
39		Bird strike		V			- 	٧
40		Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure)	V					
41		Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication.	V				 	
42		Gross loading error		V				
43		Natural or artificial obstacle on runway course			V		 	
44		Tire burst						V
45		Failures resulting in a non-standard fuel distribution		V				
46		System failure affecting aircraft configuration, controllability and/or flying qualities		V			٧	
47		Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown		V				V
48		Convective weather encounter		V				V
49		Extreme turbulence encounter		V				
50		Crew incapacitation resulted from illness (e.g. food poisoning)		V				
51		TCAS RA events (genuine or spurious)				V	 	
52		Continued unstabilized approach (failure to comply with go-around criteria and policy)		V			 	V
53		System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)		V			 	٧
54		Missed approach execution necessary after prolonged flight due to e. g. extreme weather		V				٧
55		Crew is incapable in result of shock related to hard landing		V				٧
56		Failures affecting TCAS operation				V	 	
57		Convective weather - heavy rain resulted with wet RWY surface					٧	
58		Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly						٧
59		Temporary loss of directional control during rollout						٧
1	The safety impact of each	System failure affecting the operation of primary instruments / displays or standby instruments		V	V	V	٧	٧



	Safety Performance	Precursors		Operational issue 1 2 3 4 5								
No.	Indicators	riecuisuis	1	2	3	4	5	6				
	significant aircraft modification is assessed and deemed acceptable before the actual introduction of the modification											
2		System failure affecting aircraft configuration, controllability and/or flying qualities		V			V					
3		Adverse weather / poor visibility conditions / darkness	٧	V	V	V		٧				
4		Convective weather encounter		٧		V		V				
5		Contaminated Runway		٧			٧	V				
6		Tire burst		٧			٧	V				
7		Convective weather / turbulence / windshear or crosswind conditions during take-off		V			٧	V				
8		Wildlife incursion		V			٧	V				
9		Bird strike		V			٧	V				
10		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	٧	V				٧				
11		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	V	V				V				
12		Extreme icing conditions encounter		٧			٧					
13		Volcanic ash encounter		V								
14		Extreme turbulence encounter		V								
15		Windshear encounter		V								
16		Uncommanded thrust asymmetry		V								
17		Failures resulting in a non-standard fuel distribution		V								
18		Convective weather - heavy rain / hail resulted with engine compressor failure		V								
19		Fuel leak		V								
20		Inadequate fuel quality / type		٧								
21		Low-on-fuel condition / fuel starvation		V								
22		Engine overheating		٧								
23		Prolonged loss of communications (PLOC) between pilot and controller(s)			٧		V					
24		Frontal surface encounter		V				V				
25		GPWS / TAWS alert / warning (genuine or spurious)			V							



	Safety Performance	Precursors		Operational issue 2							
No.	Indicators	Precursors	1	2	3	4	5	6			
26		MSAW warning			V						
27		Cargo loading unsecured / shift		V							
28		Error in preparation of database for FMS			٧						
29		Ground Navigational Aid failure			V						
30		Inadequate NOTAM information concerning ground navigational aid failure			V						
31		Inadequate navigational chart			V						
32		Hard landing		V				V			
33		Bounced landing		V				V			
34		Emergency landing	V				V				
35		Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate		V			V	V			
36		Midair collision		V							
37		Collision with ground obstacle		V							
38		Prolonged loss of communication (PLOC) between pilot and controller				V					
39		Airspace infringement				V					
40		System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System				V					
41		Other cases of loss of separation				V					
42		Convective weather encounter in traffic intensive airport proximity				V					
43		Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	V				V				
44		Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly						٧			
45		Deep (long) landing		V				V			
46		Runway confusion	V								
47		Engine stops during start or approach / landing		V							
48		Taxiway confusion	V								
49		Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWY.	V								
50		In-flight smoke / fumes / fire (in cockpit, cabin, cargo) events that could affect the crew ability to conduct their duties and/or the aircraft controllability		٧							
51		AOA prevents missed approach		V				V			
52		Flaws in ground equipment maintenance process	V								



	Safety Performance	Precursors	T	Ор	eration	al issu	e	
No.	Indicators	Frecursors	1	2	3	4	5	6
53		Taxiway incursion	V				l	
54		Stand confusion	V					
55		Turbulence encounter		V				
56		Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure)	V					
57		Lack of adherence to SOP for GND movements in terms of marshalling procedure	V					
58		Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication.	V					
59		Landing gear retraction failure					V	
60		Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll					٧	
61		Contaminated wing		V			V	
62		Continued unstabilized approach (failure to comply with go-around criteria and policy)		V				٧
63		Gross loading error		V				
64		Convective weather / turbulence / windshear encounter conditions during landing						٧
65		Engine failure					V	
66		Cabin pressure drop as a result of pneumatic system failure					V	
67		inadequate anti-ice fluid holdover Time (HOT)		V				
68		Extreme icing condition and / or heavy snow. Break in airport operation due to adverse weather or / and necessity of RWY		V				
69		surface maintenance. Natural or artificial obstacle on runway course	+	ļ .				
		·	+		V			
70		Convective weather - heavy rain resulted with wet RWY surface					V	
71		Risk of dangerous occurences appeared during take-off roll					V	
72		Temporary loss of directional control during rollout	<u> </u>					V
73		Cautions / warnings (genuine or spurious) that may lead to a low-speed or high-speed rejected take-off					V	
74		Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown		V				V
75		System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)		V				V
76		Severe engine failure		V				
77		Crew incapacitation resulted from illness (e.g. food poisoning)		V			ļ	
78		TCAS RA events (genuine or spurious)				V	L	
79		Severe failure of all engines on transoceanic route or over rarely populated area		V			L	
80		Missed approach execution necessary after prolonged flight due to e. g. extreme weather		V			l	V



	Safety Performance	Ducasinos		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
81		Crew is incapable in result of shock related to hard landing		V				V
82		Crew is incapable in result of extreme turbulence		V				
83		Engine suffers severe surge		V				
84		Failures affecting TCAS operation				V		
1	The actual safety impact of each significant aircraft modification is evaluated at most after 3 years of implementation of the modification	System failure affecting the operation of primary instruments / displays or standby instruments		V	V	V	V	V
2		System failure affecting aircraft configuration, controllability and/or flying qualities		٧			٧	
3		Adverse weather / poor visibility conditions / darkness	V	V	V	V		V
4		Convective weather encounter		V		V		V
5		Contaminated Runway		V			V	V
6		Tire burst		V			V	V
7		Convective weather / turbulence / windshear or crosswind conditions during take-off		٧			٧	٧
8		Wildlife incursion		V			V	V
9		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	V	V				V
10		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	V	V				٧
11		Bird strike		V			V	V
12		Extreme icing conditions encounter		V			V	
13		Volcanic ash encounter		V				
14		Extreme turbulence encounter		V				
15		Windshear encounter		V				
16		Uncommanded thrust asymmetry		V				
17		Failures resulting in a non-standard fuel distribution		V				
18		Convective weather - heavy rain / hail resulted with engine compressor failure		٧				
19		Fuel leak		٧				
20		Inadequate fuel quality / type		٧				
21		Low-on-fuel condition / fuel starvation		٧			-	



	Safety Performance	Decompose		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
22		Engine overheating		٧				
23		Prolonged loss of communications (PLOC) between pilot and controller(s)			V		٧	
24		Frontal surface encounter		٧				٧
25		GPWS / TAWS alert / warning (genuine or spurious)			V			
26		MSAW warning			V			
27		Cargo loading unsecured / shift		٧				
28		Error in preparation of database for FMS			V			
29		Ground Navigational Aid failure			V			
30		Inadequate NOTAM information concerning ground navigational aid failure			V			
31		Inadequate navigational chart			V			
32		Hard landing		٧				V
33		Bounced landing		٧				V
34		Emergency landing	V				٧	
35		Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate		V			٧	V
36		Midair collision		٧				
37		Collision with ground obstacle		٧				
38		Prolonged loss of communication (PLOC) between pilot and controller				V		
39		Airspace infringement				V		
40		System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System				V		
41		Other cases of loss of separation				V		
42		Convective weather encounter in traffic intensive airport proximity				V		
43		Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	V				٧	
44		Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly						V
45		Deep (long) landing		V				V
46		Runway confusion	V					
47		Engine stops during start or approach / landing		٧				
48		Taxiway confusion	V				·	
49		Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWY.	V				1	



	Safety Performance	Description		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
50		In-flight smoke / fumes / fire (in cockpit, cabin, cargo) events that could affect the crew ability to conduct their duties and/or the aircraft controllability		V				
51		AOA prevents missed approach		V				V
52		Flaws in ground equipment maintenance process	V					
53		Taxiway incursion	V					
54		Stand confusion	٧					
55		Turbulence encounter		V				
56		Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure)	V					
57		Lack of adherence to SOP for GND movements in terms of marshalling procedure	٧					
58		Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication.	V					
59		Landing gear retraction failure					V	
60		Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll					V	
61		Contaminated wing		٧			V	
62		Continued unstabilized approach (failure to comply with go-around criteria and policy)		V				V
63		Gross loading error		V				
64		Convective weather / turbulence / windshear encounter conditions during landing						٧
65		Engine failure					٧	
66		Cabin pressure drop as a result of pneumatic system failure					V	
67		inadequate anti-ice fluid holdover Time (HOT)		V				
68		Extreme icing condition and / or heavy snow. Break in airport operation due to adverse weather or / and necessity of RWY surface maintenance.		٧				
69		Natural or artificial obstacle on runway course			V			
70		Convective weather - heavy rain resulted with wet RWY surface					٧	
71		Risk of dangerous occurences appeared during take-off roll					٧	
72		Temporary loss of directional control during rollout						V
73		Cautions / warnings (genuine or spurious) that may lead to a low-speed or high-speed rejected take-off					٧	
74		Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown		٧				٧
75		System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)		٧				٧
76		Severe engine failure		V			 	



	Safety Performance	Draguesara		Op	eration			
No.	Indicators	Precursors	1	2	3	4	5	6
77		Crew incapacitation resulted from illness (e.g. food poisoning)		٧				
78		TCAS RA events (genuine or spurious)				V		
79		Severe failure of all engines on transoceanic route or over rarely populated area		V				
80		Missed approach execution necessary after prolonged flight due to e. g. extreme weather		V				V
81		Crew is incapable in result of shock related to hard landing		V				V
82		Crew is incapable in result of extreme turbulence		V				
83		Engine suffers severe surge		V				
84		Failures affecting TCAS operation				V		
1	The safety impact of each significant ATM provision modification is assessed and deemed acceptable before the actual introduction of the modification	Adverse weather / poor visibility conditions / darkness	V	V	٧	>		V
2		System failure affecting the operation of primary instruments / displays or standby instruments		V	٧	V	V	٧
3		Convective weather / turbulence / windshear or crosswind conditions during take-off		V			V	V
4		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	٧	V				
5		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	٧	V				
6		Prolonged loss of communications (PLOC) between pilot and controller(s)			٧		V	
7		Ground Navigational Aid failure			V			
8		Inadequate NOTAM information concerning ground navigational aid failure			٧			
9		GPWS / TAWS alert / warning (genuine or spurious)			٧			
10		MSAW warning			V			
11		Error in preparation of database for FMS			V			
12		Inadequate navigational chart			V			
13		Emergency landing	V				V	
14		Volcanic ash encounter		V	_			
15		Contaminated Runway		V			V	
16		Cargo loading unsecured / shift		V				



	Safety Performance	Drawwase		Ор	eration	al issu	<u></u>	
No.	Indicators	Precursors	1	2	3	4	5	6
17		Airspace infringement				٧	1	
18		Midair collision		V				
19		Collision with ground obstacle		V			1	
20		Prolonged loss of communication (PLOC) between pilot and controller				V		
21		Other cases of loss of separation				V	1	
22		Convective weather encounter in traffic intensive airport proximity				V	1	
23		System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System				V	1	
24		Wildlife incursion		٧			V	
25		System failure affecting aircraft configuration, controllability and/or flying qualities		V			V	
26		Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	V				V	
27		Runway confusion	V				1	
28		Hard landing		V			1	V
29		Taxiway confusion	V				 	
30		Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWY.	V				 	
31		In-flight smoke / fumes / fire (in cockpit, cabin, cargo) events that could affect the crew ability to conduct their duties and/or the aircraft controllability		٧				
32		Bounced landing		V			1	V
33		Deep (long) landing		V				V
34		AOA prevents missed approach		V			1	V
35		Convective weather encounter		٧		V		V
36		Extreme turbulence encounter		٧				
37		Bird strike		V			V	
38		Taxiway incursion	V				1	
39		Stand confusion	V					
40		Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure)	V				1	
41		Lack of adherence to SOP for GND movements in terms of marshalling procedure	V					
42		Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication.	V					
43		Flaws in ground equipment maintenance process	V					
44		Windshear encounter		٧			-	



	Safety Performance	Precursors		Op	eration	al issu	e	
No.	Indicators	Precuisors	1	2	3	4	5	6
45		Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll					V	
46		Turbulence encounter		V				
47		Natural or artificial obstacle on runway course			V			
48		Landing gear retraction failure					V	
49		Frontal surface encounter		V				
50		Engine failure					٧	
51		Cabin pressure drop as a result of pneumatic system failure					٧	
52		Risk of dangerous occurences appeared during take-off roll					V	
53		Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown		V			1	V
54		Crew incapacitation resulted from illness (e.g. food poisoning)		V			 	
55		TCAS RA events (genuine or spurious)				V		
56		Continued unstabilized approach (failure to comply with go-around criteria and policy)		V			 	V
57		System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)		V				V
58		Missed approach execution necessary after prolonged flight due to e. g. extreme weather		V				V
59		Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate		V				٧
60		Convective weather - heavy rain resulted with wet RWY surface					V	
61		Crew is incapable in result of shock related to hard landing		V			1	V
62		Failures affecting TCAS operation				V		
1	The actual safety impact of each significant ATM provision modification is evaluated at most after 3 years of implementation of the modification	Adverse weather / poor visibility conditions / darkness	V	V	V	V		V
2		System failure affecting the operation of primary instruments / displays or standby instruments		V	V	V	V	V
3		Convective weather / turbulence / windshear or crosswind conditions during take-off		٧			٧	٧
4		Prolonged loss of communications (PLOC) between pilot and controller(s)			٧		٧	
5		Ground Navigational Aid failure			٧			
6		Inadequate NOTAM information concerning ground navigational aid failure			V			
7		GPWS / TAWS alert / warning (genuine or spurious)			V		1	



	Safety Performance	Discourses		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
8		MSAW warning			V			
9		Error in preparation of database for FMS			V			
10		Inadequate navigational chart			V			
11		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	V	V				
12		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	V	V				
13		Emergency landing	V				V	
14		Airspace infringement				V		
15		Prolonged loss of communication (PLOC) between pilot and controller				V		
16		Other cases of loss of separation				V		
17		Convective weather encounter in traffic intensive airport proximity				V		
18		System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System				V		
19		System failure affecting aircraft configuration, controllability and/or flying qualities		V			V	
20		Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	V				V	
21		Runway confusion	V					
22		Hard landing		V				V
23		Taxiway confusion	V					
24		Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWY.	V					
25		Bounced landing		V				V
26		Deep (long) landing		V				V
27		AOA prevents missed approach		V				V
28		Convective weather encounter		V		V		V
29		Extreme turbulence encounter		V				
30		Bird strike		V			V	
31		Taxiway incursion	V					
32		Stand confusion	V					
33		Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure)	V					
34		Lack of adherence to SOP for GND movements in terms of marshalling procedure	V					
35		Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication.	V					



	Safety Performance	Ducasiyaaya		Operational issue 1 2 3 4 5 V					
No.	Indicators	Precursors	1	2	3	4	5	6	
36		Flaws in ground equipment maintenance process	V						
37		Windshear encounter		V					
38		Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll					V		
39		Wildlife incursion					V		
40		Turbulence encounter		V					
41		Natural or artificial obstacle on runway course			V				
42		Landing gear retraction failure					٧		
43		Frontal surface encounter		V					
44		Engine failure					٧		
45		Cabin pressure drop as a result of pneumatic system failure					V		
46		Risk of dangerous occurences appeared during take-off roll					٧		
47		Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown		V				٧	
48		In-flight smoke / fumes / fire (in cockpit, cabin, cargo) events that could affect the crew ability to conduct their duties and/or the aircraft controllability		٧					
49		Crew incapacitation resulted from illness (e.g. food poisoning)		٧					
50		TCAS RA events (genuine or spurious)				V			
51		Continued unstabilized approach (failure to comply with go-around criteria and policy)		٧				٧	
52		System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)		V				٧	
53		Contaminated Runway					٧		
54		Missed approach execution necessary after prolonged flight due to e. g. extreme weather		V				٧	
55		Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate		V				٧	
56		Convective weather - heavy rain resulted with wet RWY surface					٧		
57		Crew is incapable in result of shock related to hard landing		V				٧	
58		Failures affecting TCAS operation				V			
1	The safety impact of an aircraft flying under an outdated certification scheme is assessed after each significant change in certification rules	System failure affecting the operation of primary instruments / displays or standby instruments		V	V	V	V	V	



	Safety Performance	Ducaturana		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
2		System failure affecting aircraft configuration, controllability and/or flying qualities		V			٧	
3		Adverse weather / poor visibility conditions / darkness	V	V	V	V		V
4		Contaminated Runway		٧			V	٧
5		Convective weather encounter		V		V		V
6		Tire burst		V			V	V
7		Convective weather / turbulence / windshear or crosswind conditions during take-off		٧			٧	V
8		Wildlife incursion		٧			٧	٧
9		Bird strike		٧			٧	V
10		Extreme icing conditions encounter		٧			٧	
11		Volcanic ash encounter		V				
12		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	V	٧				V
13		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	V	V				V
14		Extreme turbulence encounter		V				
15		Windshear encounter		V				
16		Uncommanded thrust asymmetry		٧				
17		Failures resulting in a non-standard fuel distribution		٧				
18		Convective weather - heavy rain / hail resulted with engine compressor failure		٧				
19		Fuel leak		V				
20		Inadequate fuel quality / type		٧				
21		Low-on-fuel condition / fuel starvation		٧				
22		Engine overheating		V				
23		Prolonged loss of communications (PLOC) between pilot and controller(s)			V		٧	
24		Frontal surface encounter		V				٧
25		GPWS / TAWS alert / warning (genuine or spurious)			V			
26		MSAW warning			V			
27		Cargo loading unsecured / shift		٧				
28		Error in preparation of database for FMS			V			
29		Ground Navigational Aid failure			V			



	Safety Performance	Decompose		Ор	eration	al issu	<u> </u>	
No.	Indicators	Precursors	1	2	3	4	5	6
30		Inadequate NOTAM information concerning ground navigational aid failure			V			
31		Inadequate navigational chart			V			
32		Hard landing		V				V
33		Bounced landing		V				V
34		Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate		V			٧	V
35		Midair collision		V				
36		Collision with ground obstacle		V				
37		Prolonged loss of communication (PLOC) between pilot and controller				V		
38		Airspace infringement				V		
39		Convective weather encounter in traffic intensive airport proximity				V		
40		System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System				V		
41		Other cases of loss of separation				V		
42		Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly						V
43		Runway confusion	V					
44		Deep (long) landing		V				V
45		Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWY.	V					
46		Engine stops during start or approach / landing		V				
47		Taxiway confusion	V					
48		Emergency landing	V					
49		In-flight smoke / fumes / fire (in cockpit, cabin, cargo) events that could affect the crew ability to conduct their duties and/or the aircraft controllability		٧				
50		AOA prevents missed approach		V				V
51		Turbulence encounter		V				
52		Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure)	V					
53		Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication.	V					
54		Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	V					
55		Flaws in ground equipment maintenance process	V					
56		Taxiway incursion	V					



	Safety Performance	Ducasinos		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
57		Stand confusion	V					
58		Landing gear retraction failure					٧	
59		Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll					٧	
60		Lack of adherence to SOP for GND movements in terms of marshalling procedure	V					
61		Continued unstabilized approach (failure to comply with go-around criteria and policy)		V				V
62		Convective weather / turbulence / windshear encounter conditions during landing						V
63		Engine failure					٧	
64		Cabin pressure drop as a result of pneumatic system failure					٧	
65		Contaminated wing		V			٧	
66		Gross loading error		V				
67		Natural or artificial obstacle on runway course			V			
68		Temporary loss of directional control during rollout						٧
69		Cautions / warnings (genuine or spurious) that may lead to a low-speed or high-speed rejected take-off					٧	
70		Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown		V				V
71		Convective weather - heavy rain resulted with wet RWY surface					٧	
72		System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)		V				٧
73		Severe engine failure		V				
74		Crew incapacitation resulted from illness (e.g. food poisoning)		V				
75		TCAS RA events (genuine or spurious)				V		
76		Severe failure of all engines on transoceanic route or over rarely populated area		V				
77		Missed approach execution necessary after prolonged flight due to e. g. extreme weather		V				٧
78		Crew is incapable in result of shock related to hard landing		٧				٧
79		Crew is incapable in result of extreme turbulence		V				
80		Engine suffers severe surge		V				
81		Failures affecting TCAS operation				V		
1	A proper means to identify future risks is set-up and altered when deemed necessary	System failure affecting the operation of primary instruments / displays or standby instruments		٧	V	V	V	V



	Safety Performance	Discourses	T	Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
2		Adverse weather / poor visibility conditions / darkness	V	V	V	٧		V
3		System failure affecting aircraft configuration, controllability and/or flying qualities		V			٧	
4		Convective weather encounter		V		V		V
5		Contaminated Runway		V			V	V
6		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	V	V				V
7		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	V	V				V
8		Convective weather / turbulence / windshear or crosswind conditions during take-off		V			V	V
9		Tire burst		V			٧	V
10		Wildlife incursion		V			٧	V
11		Bird strike		V			٧	V
12		Extreme icing conditions encounter		V			٧	
13		Volcanic ash encounter		V				
14		Extreme turbulence encounter		V				
15		Windshear encounter		V				
16		Uncommanded thrust asymmetry		V				
17		Failures resulting in a non-standard fuel distribution		V				
18		Convective weather - heavy rain / hail resulted with engine compressor failure		V				
19		Fuel leak		V				
20		Inadequate fuel quality / type		V				
21		Low-on-fuel condition / fuel starvation		V				
22		Engine overheating		V				
23		Prolonged loss of communications (PLOC) between pilot and controller(s)			V		٧	
24		Frontal surface encounter		V				V
25		GPWS / TAWS alert / warning (genuine or spurious)			V			
26		MSAW warning			V			
27		Cargo loading unsecured / shift		٧				
28		Ground Navigational Aid failure			V			
29		Inadequate NOTAM information concerning ground navigational aid failure			V			



	Safety Performance	Precursors		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
30		Error in preparation of database for FMS			V			
31		Inadequate navigational chart			V			
32		Hard landing		V				V
33		Emergency landing	V				V	
34		Bounced landing		V				٧
35		Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate		V			V	٧
36		Midair collision		V				
37		Collision with ground obstacle		V				
38		Airspace infringement				V		
39		Prolonged loss of communication (PLOC) between pilot and controller				V		
40		Other cases of loss of separation				V		
41		Convective weather encounter in traffic intensive airport proximity				V		
42		System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System				V		
43		Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	V				٧	
44		Runway confusion	V					
45		Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly						V
46		Taxiway confusion	V					
47		In-flight smoke / fumes / fire (in cockpit, cabin, cargo) events that could affect the crew ability to conduct their duties and/or the aircraft controllability		٧				
48		Deep (long) landing		V				V
49		Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWY.	V					
50		Flaws in ground equipment maintenance process	V					
51		Engine stops during start or approach / landing		V				
52		Taxiway incursion	V					
53		AOA prevents missed approach		٧				٧
54		Lack of adherence to SOP for GND movements in terms of marshalling procedure	V					·
55		Stand confusion	V					
56		Turbulence encounter		٧				1



	Safety Performance	Precursors	T	Ор	eration	al issu	e	-
No.	Indicators	FIECUISOIS	1	2	3	4	5	6
57		Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure)	V					
58		Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication.	V					
59		Landing gear retraction failure					V	
60		Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll					V	
61		Contaminated wing		V			V	
62		Continued unstabilized approach (failure to comply with go-around criteria and policy)		V				٧
63		Gross loading error		V				
64		Convective weather / turbulence / windshear encounter conditions during landing						٧
65		Engine failure					V	
66		Cabin pressure drop as a result of pneumatic system failure					V	
67		Risk of dangerous occurences appeared during take-off roll					V	
68		inadequate anti-ice fluid holdover Time (HOT)		V				
69		Extreme icing condition and / or heavy snow. Break in airport operation due to adverse weather or / and necessity of RWY surface maintenance.		٧				
70		Natural or artificial obstacle on runway course			V			
71		Convective weather - heavy rain resulted with wet RWY surface					٧	
72		Temporary loss of directional control during rollout						٧
73		Cautions / warnings (genuine or spurious) that may lead to a low-speed or high-speed rejected take-off					٧	
74		Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown		٧				٧
75		System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)		٧				٧
76		Severe engine failure		V				
77		Crew incapacitation resulted from illness (e.g. food poisoning)		V				
78		TCAS RA events (genuine or spurious)				V		
79		Severe failure of all engines on transoceanic route or over rarely populated area		V				
80		Missed approach execution necessary after prolonged flight due to e. g. extreme weather		٧				٧
81		Crew is incapable in result of shock related to hard landing		٧				٧
82		Cabin pressure drop as a result of aircraft structural failure		٧				
83		Crew is incapable in result of extreme turbulence		٧				
84		Engine suffers severe surge		٧				



	Safety Performance	Draguyaawa		Ор	eration	al issu	<u> </u>	
No.	Indicators	Precursors	1	2	3	4	5	6
85		Failures affecting TCAS operation				V	1	
1	Future risk are identified on a regular basis (at least each year new risks should be identified) using a dedicated means to do so	System failure affecting the operation of primary instruments / displays or standby instruments		V	V	V	V	V
2		Adverse weather / poor visibility conditions / darkness	V	V	٧	V	<u> </u>	V
3		System failure affecting aircraft configuration, controllability and/or flying qualities		V			V	
4		Convective weather encounter		V		V		٧
5		Contaminated Runway		V			V	V
6		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	V	V				V
7		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	٧	V				٧
8		Convective weather / turbulence / windshear or crosswind conditions during take-off		V			V	V
9		Tire burst		V			V	V
10		Wildlife incursion		V			٧	٧
11		Bird strike		V			V	V
12		Extreme icing conditions encounter		V			V	
13		Volcanic ash encounter		V			-	
14		Extreme turbulence encounter		V				
15		Windshear encounter		V				
16		Uncommanded thrust asymmetry		V				
17		Failures resulting in a non-standard fuel distribution		V				
18		Convective weather - heavy rain / hail resulted with engine compressor failure		V				
19		Fuel leak		V			-	
20		Inadequate fuel quality / type		V			1	
21		Low-on-fuel condition / fuel starvation		V				
22		Engine overheating		V				
23		Prolonged loss of communications (PLOC) between pilot and controller(s)			V		V	
24		Frontal surface encounter		V				V



	Safety Performance	Precursors		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
25		GPWS / TAWS alert / warning (genuine or spurious)			V			
26		MSAW warning			V			
27		Cargo loading unsecured / shift		٧				
28		Ground Navigational Aid failure			V			
29		Inadequate NOTAM information concerning ground navigational aid failure			V			
30		Error in preparation of database for FMS			V			
31		Inadequate navigational chart			V			
32		Hard landing		٧				٧
33		Emergency landing	V				٧	
34		Bounced landing		V				٧
35		Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate		٧			٧	V
36		Midair collision		V				
37		Collision with ground obstacle		V				
38		Airspace infringement				V		
39		Prolonged loss of communication (PLOC) between pilot and controller				V		
40		Other cases of loss of separation				V		
41		Convective weather encounter in traffic intensive airport proximity				V		
42		System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System				V		
43		Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	V				٧	
44		Runway confusion	V					
45		Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly						٧
46		Taxiway confusion	V					
47		In-flight smoke / fumes / fire (in cockpit, cabin, cargo) events that could affect the crew ability to conduct their duties and/or the aircraft controllability		V				
48		Deep (long) landing		V				V
49		Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWY.	V					
50		Flaws in ground equipment maintenance process	V					
51		Engine stops during start or approach / landing		V			_ 	



	Safety Performance	Precursors	1	Ор	eration	al issu	e	
No.	Indicators	Precuisors	1	2	3	4	5	6
52		Taxiway incursion	V					
53		AOA prevents missed approach		V				٧
54		Lack of adherence to SOP for GND movements in terms of marshalling procedure	V					
55		Stand confusion	V					
56		Turbulence encounter		V				
57		Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure)	V					
58		Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication.	V					
59		Landing gear retraction failure					V	
60		Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll					V	
61		Contaminated wing		V			V	
62		Continued unstabilized approach (failure to comply with go-around criteria and policy)		V				٧
63		Gross loading error		V				
64		Convective weather / turbulence / windshear encounter conditions during landing						٧
65		Engine failure					V	
66		Cabin pressure drop as a result of pneumatic system failure					V	
67		inadequate anti-ice fluid holdover Time (HOT)		V				
68		Extreme icing condition and / or heavy snow. Break in airport operation due to adverse weather or / and necessity of RWY surface maintenance.		٧				
69		Natural or artificial obstacle on runway course			V			
70		Convective weather - heavy rain resulted with wet RWY surface					٧	
71		Risk of dangerous occurences appeared during take-off roll					V	
72		Temporary loss of directional control during rollout						٧
73		Cautions / warnings (genuine or spurious) that may lead to a low-speed or high-speed rejected take-off					V	
74		Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown		V				V
75		System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)		٧				٧
76		Severe engine failure		٧				
77		Crew incapacitation resulted from illness (e.g. food poisoning)		٧				
78		TCAS RA events (genuine or spurious)	1			V		
79		Severe failure of all engines on transoceanic route or over rarely populated area		V				



	Safety Performance	Ducasiyaaya		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
80		Missed approach execution necessary after prolonged flight due to e. g. extreme weather		٧				V
81		Crew is incapable in result of shock related to hard landing		V				V
82		Cabin pressure drop as a result of aircraft structural failure		V				
83		Crew is incapable in result of extreme turbulence		V				
84		Engine suffers severe surge		V				
85		Failures affecting TCAS operation				V		
1	A common risk classification framework is used by CAAs and industry (using the same criteria for likelihood and severity of events)	System failure affecting the operation of primary instruments / displays or standby instruments		V	V	V	V	V
2		Adverse weather / poor visibility conditions / darkness	V	V	٧	V	<u> </u>	V
3		System failure affecting aircraft configuration, controllability and/or flying qualities		٧			V	
4		Convective weather encounter		V		V		V
5		Contaminated Runway		V			V	V
6		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	V	V				V
7		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	V	V				V
8		Convective weather / turbulence / windshear or crosswind conditions during take-off		V			V	٧
9		Tire burst		V			V	٧
10		Wildlife incursion		V			V	V
11		Bird strike		V			V	V
12		Extreme icing conditions encounter		V			V	
13		Volcanic ash encounter		V			1	
14		Extreme turbulence encounter		V			 	
15		Windshear encounter		V			1	
16		Uncommanded thrust asymmetry		٧			1	
17		Failures resulting in a non-standard fuel distribution		V				
18		Convective weather - heavy rain / hail resulted with engine compressor failure		٧				
19		Fuel leak		V				



	Safety Performance	Precursors		Op	eration	al issu	e	
No.	Indicators	Precuisois	1	2	3	4	5	6
20		Inadequate fuel quality / type		٧				
21		Low-on-fuel condition / fuel starvation		V				
22		Engine overheating		V				
23		Prolonged loss of communications (PLOC) between pilot and controller(s)			V		٧	
24		Frontal surface encounter		V				٧
25		GPWS / TAWS alert / warning (genuine or spurious)			V			
26		MSAW warning			V			
27		Cargo loading unsecured / shift		V				
28		Ground Navigational Aid failure			V			
29		Inadequate NOTAM information concerning ground navigational aid failure			V			
30		Error in preparation of database for FMS			V			
31		Inadequate navigational chart			V			
32		Hard landing		V				٧
33		Bounced landing		V				٧
34		Emergency landing	V				٧	
35		Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate		V			٧	٧
36		Midair collision		V				
37		Collision with ground obstacle		V				
38		Airspace infringement				٧		
39		Prolonged loss of communication (PLOC) between pilot and controller				٧		
40		Other cases of loss of separation				٧		
41		Convective weather encounter in traffic intensive airport proximity				٧		
42		System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System				٧		
43		Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	V				V	
44		Runway confusion	V					
45		Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly						V
46		Taxiway confusion	V					
47		In-flight smoke / fumes / fire (in cockpit, cabin, cargo) events that could affect the crew ability to conduct their duties and/or		V				



	Safety Performance	Dracureare	T	Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
		the aircraft controllability						
48		Deep (long) landing		V				V
49		Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWY.	V					
50		Engine stops during start or approach / landing		V				
51		Flaws in ground equipment maintenance process	V					
52		Taxiway incursion	٧					
53		AOA prevents missed approach		V				٧
54		Stand confusion	V					
55		Turbulence encounter		V				
56		Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure)	V					
57		Lack of adherence to SOP for GND movements in terms of marshalling procedure	V					
58		Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication.	V					
59		Landing gear retraction failure					V	
60		Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll					V	
61		Contaminated wing		V			V	
62		Continued unstabilized approach (failure to comply with go-around criteria and policy)		V				V
63		Gross loading error		V				
64		Convective weather / turbulence / windshear encounter conditions during landing						V
65		Engine failure					V	
66		Cabin pressure drop as a result of pneumatic system failure					V	
67		inadequate anti-ice fluid holdover Time (HOT)		V				
68		Extreme icing condition and / or heavy snow. Break in airport operation due to adverse weather or / and necessity of RWY surface maintenance.		V				
69		Natural or artificial obstacle on runway course			V			
70		Convective weather - heavy rain resulted with wet RWY surface					V	
71		Risk of dangerous occurences appeared during take-off roll					V	
72		Temporary loss of directional control during rollout						V
73		Cautions / warnings (genuine or spurious) that may lead to a low-speed or high-speed rejected take-off	1				V	
74		Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown	1	V				٧



	Safety Performance	Drocurrors		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
75		System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)		V				٧
76		Severe engine failure		V				
77		Crew incapacitation resulted from illness (e.g. food poisoning)		V				
78		TCAS RA events (genuine or spurious)				V		
79		Severe failure of all engines on transoceanic route or over rarely populated area		V				
80		Missed approach execution necessary after prolonged flight due to e. g. extreme weather		V				V
81		Crew is incapable in result of shock related to hard landing		V				V
82		Cabin pressure drop as a result of aircraft structural failure		V				
83		Crew is incapable in result of extreme turbulence		V				
84		Engine suffers severe surge		V				
85		Failures affecting TCAS operation				V		
1	The number of organisations that have fully implemented a Safety Management System before the final transitional dates allowed	System failure affecting the operation of primary instruments / displays or standby instruments		V	V	V	V	V
2		Adverse weather / poor visibility conditions / darkness	V	V	V	٧		٧
3		System failure affecting aircraft configuration, controllability and/or flying qualities		V			٧	
4		Convective weather encounter		V		V		V
5		Contaminated Runway		V			٧	V
6		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	V	V				V
7		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	V	V				V
8		Convective weather / turbulence / windshear or crosswind conditions during take-off		V			V	V
9		Tire burst		V			٧	V
10		Wildlife incursion		٧			٧	٧
11		Bird strike		٧			٧	٧
12		Extreme icing conditions encounter		V			٧	
13		Volcanic ash encounter		V				
14		Extreme turbulence encounter		V				



	Safety Performance	Descriptions		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
15		Windshear encounter		V				
16		Uncommanded thrust asymmetry		V				
17		Failures resulting in a non-standard fuel distribution		V				
18		Convective weather - heavy rain / hail resulted with engine compressor failure		V				
19		Fuel leak		V				
20		Inadequate fuel quality / type		V				
21		Low-on-fuel condition / fuel starvation		V				
22		Engine overheating		V				
23		Prolonged loss of communications (PLOC) between pilot and controller(s)			V		V	
24		Frontal surface encounter		V				٧
25		GPWS / TAWS alert / warning (genuine or spurious)			V			
26		MSAW warning			V			
27		Cargo loading unsecured / shift		V				
28		Ground Navigational Aid failure			V			
29		Inadequate NOTAM information concerning ground navigational aid failure			V			
30		Error in preparation of database for FMS			V			
31		Inadequate navigational chart			V			
32		Hard landing		V				٧
33		Emergency landing	V				V	
34		Bounced landing		V				٧
35		Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate		V			V	V
36		Midair collision		V				
37		Collision with ground obstacle		V				
38		Airspace infringement				V		
39		Prolonged loss of communication (PLOC) between pilot and controller				V		
40		Other cases of loss of separation				V		
41		Convective weather encounter in traffic intensive airport proximity				V		
42		System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System				V		



	Safety Performance	Draguesara	1	Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
43		Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	٧				V	
44		Runway confusion	٧					
45		Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly						V
46		Taxiway confusion	V				1	
47		In-flight smoke / fumes / fire (in cockpit, cabin, cargo) events that could affect the crew ability to conduct their duties and/or the aircraft controllability		V				
48		Deep (long) landing		V				V
49		Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWY.	٧					
50		Flaws in ground equipment maintenance process	V					
51		Engine stops during start or approach / landing		V				
52		Taxiway incursion	٧					
53		AOA prevents missed approach		V				V
54		Lack of adherence to SOP for GND movements in terms of marshalling procedure	V					
55		Stand confusion	V					
56		Turbulence encounter		V				
57		Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure)	V					
58		Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication.	V					
59		Landing gear retraction failure					V	
60		Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll					V	
61		Contaminated wing		V			V	
62		Continued unstabilized approach (failure to comply with go-around criteria and policy)		V				V
63		Gross loading error		V				
64		Convective weather / turbulence / windshear encounter conditions during landing						V
65		Engine failure					V	
66		Cabin pressure drop as a result of pneumatic system failure					٧	
67		inadequate anti-ice fluid holdover Time (HOT)		V				
68		Extreme icing condition and / or heavy snow. Break in airport operation due to adverse weather or / and necessity of RWY surface maintenance.		V				
69		Natural or artificial obstacle on runway course			V			



	Safety Performance	Precursors		Op	eration			
No.	Indicators	Precuisors	1	2	3	4	5	6
70		Convective weather - heavy rain resulted with wet RWY surface					٧	
71		Risk of dangerous occurences appeared during take-off roll					V	
72		Temporary loss of directional control during rollout						V
73		Cautions / warnings (genuine or spurious) that may lead to a low-speed or high-speed rejected take-off					V	
74		Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown		V				٧
75		System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)		V				V
76		Severe engine failure		V				
77		Crew incapacitation resulted from illness (e.g. food poisoning)		V				
78		TCAS RA events (genuine or spurious)				V		
79		Severe failure of all engines on transoceanic route or over rarely populated area		V				
80		Missed approach execution necessary after prolonged flight due to e. g. extreme weather		V				V
81		Crew is incapable in result of shock related to hard landing		V				V
82		Cabin pressure drop as a result of aircraft structural failure		V				
83		Crew is incapable in result of extreme turbulence		V				
84		Engine suffers severe surge		V				
85		Failures affecting TCAS operation				V		
1	The average level of regulatory compliance of states (for example using ICAO USOAP CMA 8 or EASA audits) should be measured every three years and should increase every three years	System failure affecting the operation of primary instruments / displays or standby instruments		V	V	V	V	V
2		Adverse weather / poor visibility conditions / darkness	٧	V	V	V		٧
3		System failure affecting aircraft configuration, controllability and/or flying qualities		٧			٧	
4		Contaminated Runway		٧			٧	٧
5		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	٧	٧				٧
6		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	V	٧				٧
7		Tire burst		V			٧	٧



	Safety Performance	Dragiusaus		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
8		Wildlife incursion		V			V	V
9		Bird strike		V			V	V
10		Convective weather encounter		V		V		V
11		Extreme icing conditions encounter		V			V	
12		Volcanic ash encounter		V				
13		Convective weather / turbulence / windshear or crosswind conditions during take-off		V			V	V
14		Extreme turbulence encounter		V				
15		Windshear encounter		V				
16		Uncommanded thrust asymmetry		V				
17		Failures resulting in a non-standard fuel distribution		٧				
18		Convective weather - heavy rain / hail resulted with engine compressor failure		٧				
19		Fuel leak		٧				
20		Inadequate fuel quality / type		٧				
21		Low-on-fuel condition / fuel starvation		٧				
22		Engine overheating		V				
23		Prolonged loss of communications (PLOC) between pilot and controller(s)			V		V	
24		GPWS / TAWS alert / warning (genuine or spurious)			V			
25		MSAW warning			V			
26		Cargo loading unsecured / shift		٧				
27		Ground Navigational Aid failure			٧			
28		Inadequate NOTAM information concerning ground navigational aid failure			٧			
29		Error in preparation of database for FMS			٧			
30		Inadequate navigational chart			٧			
31		Emergency landing	V				V	
32		Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate		٧			٧	٧
33		Frontal surface encounter		٧				٧
34		Midair collision		٧				
35		Collision with ground obstacle		٧				



	Safety Performance	Draguesara		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
36		Airspace infringement				V		
37		Prolonged loss of communication (PLOC) between pilot and controller				V		
38		Hard landing		V				٧
39		Other cases of loss of separation				V		
40		Convective weather encounter in traffic intensive airport proximity				٧		
41		System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System				V		
42		Bounced landing		V				٧
43		Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	V				V	
44		Runway confusion	V					
45		Taxiway confusion	V					
46		In-flight smoke / fumes / fire (in cockpit, cabin, cargo) events that could affect the crew ability to conduct their duties and/or the aircraft controllability		V				
47		Deep (long) landing		V				٧
48		Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWY.	V					
49		Flaws in ground equipment maintenance process	V					
50		Engine stops during start or approach / landing		V				
51		Taxiway incursion	V					
52		AOA prevents missed approach		V				٧
53		Lack of adherence to SOP for GND movements in terms of marshalling procedure	V					
54		Stand confusion	V					
55		Turbulence encounter		V				
56		Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure)	V					
57		Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication.	V					
58		Landing gear retraction failure					V	
59		Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll					V	
60		Contaminated wing		٧			٧	
61		Gross loading error		V				
62		Convective weather / turbulence / windshear encounter conditions during landing						٧
63		Engine failure					٧	



	Safety Performance	Dracurcare		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
64		Cabin pressure drop as a result of pneumatic system failure					V	
65		inadequate anti-ice fluid holdover Time (HOT)		V				
66		Extreme icing condition and / or heavy snow. Break in airport operation due to adverse weather or / and necessity of RWY surface maintenance.		٧				
67		Natural or artificial obstacle on runway course			V			
68		Convective weather - heavy rain resulted with wet RWY surface					V	
69		Risk of dangerous occurences appeared during take-off roll					٧	
70		Cautions / warnings (genuine or spurious) that may lead to a low-speed or high-speed rejected take-off					V	
71		Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown		V				V
72		Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly						٧
73		Severe engine failure		V				
74		Crew incapacitation resulted from illness (e.g. food poisoning)		V				
75		System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)		V				V
76		TCAS RA events (genuine or spurious)				V		
77		Continued unstabilized approach (failure to comply with go-around criteria and policy)		V				V
78		Severe failure of all engines on transoceanic route or over rarely populated area		V				
79		Missed approach execution necessary after prolonged flight due to e. g. extreme weather		V				V
80		Crew is incapable in result of shock related to hard landing		V				V
81		Cabin pressure drop as a result of aircraft structural failure		V				
82		Crew is incapable in result of extreme turbulence		V				
83		Engine suffers severe surge		V				
84		Failures affecting TCAS operation				V		
85		Temporary loss of directional control during rollout						V



Appendix A.2 SPIs linked to procedural and flight path deviations

	Safety Performance	B		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
	TECHNOLOGY	Deviations: procedural or flight path	GCOL	I-301	CFIT	MAC	RE-TO	RE-L
131	Rate of autoflight system							
132	failures/flight	Pilot tiredness - Inadequate workload distribution		V		V	V	\vdash
		Flaws in pilot requirements definition process and/or training methodology		V		V	V	-
133		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)		V		V	V	
134		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)		V		V	٧	
135		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)		٧		٧	٧	
136		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties		V		V		
137		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components				V	٧	
138		Flaws in manufacturer quality control process - Onboard navigational systems and components.				V	٧	
139		Lack of or poor communication quality				٧	٧	
140		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology		V		V	V	
141		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution		٧		V	٧	
142		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.				V	٧	
143		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.				V	V	
144		Flaws in manufacturer quality control process - Communication equipment systems and components.				V	V	
145		Navigation deviation				٧	٧	
146		Flaws in manufacturer quality control process - Fire extinguishing system components				V	٧	
147		Lack of English proficiency				٧		
148		Incorrect or confusing / misleading ATC instructions				٧		
149		Use of non-standard phraseology by pilot and/or controller				V	<u> </u>	
150		Traffic controller tiredness - Inadequate workload distribution	_			٧		
151		Flaws in traffic controller requirements definition process and/or training methodology				V		



	Safety Performance			Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
152		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver				٧		
153		Hearback ommitted				V		
154		Altimeter setting error				V		
155		Lack of adherence to SOP for take-off procedure in terms of altimeter callibration.				V		
156		Lack of adherence to Rules of the Air - adherence to Controller clearance				V		
157		Tactical or / and Planning Controller tiredness - Inadequate workload distribution				V		
158		Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology				٧		
159		Unintuitive and / or error prone system manual - communication equipment.				V		
160		Altitude deviation				V		
161		Level bust (pilot lapse or late re-clearance by ATC)				V		
162		Failure to comply with an altitude or speed restriction / constraint				V		
163		Inadequate coordination between ATM centers and/or ATC sectors				V		
164		Flaws in Airspace and Air Traffic planning procedures design process				V		
165		Flaws in conflict and separation minima infringement detection / elimination procedures				V		
166		Lack of adherence of airlines to time contraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data.				V		
167		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MTCD System				V		
168		Lack of adherence of airlines to declared Flight Plan.				V		
169		Failure to identify the pre-tactical conflict before it reach the tactical controller				V		
170		Lack of adherence to SOP for Airborne operation in terms of minimum seprataion				V		
171		Incorrect use of communication equipment				V		
172		Military activity in controlled airport or located within controlled area				V		
173		General aviation activity in controlled airport or located within controlled area				V		
174		Intensified traffic related to general aviation activity e. g. over GA airport / airfield				V		
175		Deviation from flight trajectory commanded by controller				V		·
176		Inadequate aircraft de-icing / anti-icing		٧			٧	
177		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine		V			V	



	Safety Performance			Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
178		Flaws in manufacturer quality control process - Autothrottle system in the engine.		٧			٧	
179		Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.		V			V	
180		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of STCA System.				٧	1	
181		Lack of adherence to regulations concerning independent ATCO monitoring				٧		
182		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - STCA System				V		
183		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.		V			V	
184		Flaws in aircraft system maintenance process definition - Components of Wing control surface system.		V			V	
185		Flaws in manufacturer quality control process - Components of Wing control surface system.		V			V	
186		Difference indications of independent aircraft speed / altitude or attitude indicators		V				
187		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PFD		V				
188		Flaws in manufacturer quality control process - PFD		V				
189		Flaws in aircraft system maintenance process definition - PFD		٧				
190		Excessive bank angle		٧				
191		Lack of adherence to SOP in terms of de-icing / anti-icing procedures.		V				
192		Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination		V				
193		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Anti-icing system components		V				
194		Flaws in manufacturer quality control process - Anti-icing system components		٧				
195		Flaws in aircraft system maintenance process definition - Anti-icing systems components		٧				
196		Lack of adherence to SOP in terms of pre-flight inspections -presence of anti-contamination covers on pitot static tube		V				
197		Lack of adherence to SOP in terms of briefing and checklist before initiating of start of taxiing and take-off		V			 	
198		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Pitot static system components		V				
199		Flaws in manufacturer quality control process - Pitot static system components		٧				
200		Flaws in aircraft system maintenance process definition - Pitot static systems components		V				
201		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ADI		v				



	Safety Performance			Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
202		Flaws in manufacturer quality control process - ADI		٧				
203		Flaws in aircraft system maintenance process definition - ADI		V				
204		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ASI		V				
205		Flaws in manufacturer quality control process - ASI		V				
206		Flaws in aircraft system maintenance process definition - ASI		V				
207		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components					V	
208		Flaws in manufacturer quality control process - Power supply system components					V	
209		Lack of adherence to emergency procedures - recovery from severe FCS failure		V				
210		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.				V	V	
211		Unintuitive and / or error prone system manual - CPCS					٧	
212		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components					V	
213		Flaws in aircraft system maintenance process definition - Hydraulic System					٧	
214		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components					V	
215		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components					V	
216		Flaws in aircraft system maintenance process definition - APU systems and / or components					V	
217		Flaws in aircraft system maintenance process definition - Fire detection system components					٧	
218		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components					V	
219		Flaws in manufacturer quality control process - Fire detection system components					٧	
220		Flaws in aircraft system maintenance process definition - Fire warning system					V	
221		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system					V	
222		Flaws in manufacturer quality control process - Fire warning system					٧	
223		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components					٧	
224		Flaws in aircraft system maintenance process definition - Fire extinguishing system components					V	



	Safety Performance			Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
225		Flight below maneuvering speeds		٧				
226		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					V	
227		Poor application of T/O & RTO procedure, failure recognition and preparedness					V	
228		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Rudder components.		V				
229		Flaws in aircraft system maintenance process definition - Rudder components.		V				
230		Flaws in manufacturer quality control process - Rudder components.		V				
231		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Horizontal stabilizer components.		V				
232		Flaws in aircraft system maintenance process definition - Horizontal stabilizer components.		V				
233		Flaws in manufacturer quality control process - Horizontal stabilizer components.		V				
234		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Thrust reverse system in the engine.		V				
235		Flaws in manufacturer quality control process - Thrust reverse system in the engine.		V				
236		Flaws in aircraft system maintenance process definition - Thrust reverse system in the engine.		٧				
237		Lack of adherence to the SOP in terms of critical indicators cross-checking		٧				
238		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment					٧	
239		Poor application of T/O & RTO procedure, braking initiation sequence					V	
240		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum					V	
241		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.					٧	
242		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.					٧	
243		Poor application of T/O & RTO procedure, computation of T/O parameters					٧	
244		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ACAS system components				٧		
245		Inappropriate visual avoidance maneuver				٧		
246		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ACAS installed on aircraft.				V		
247		Late or inadequate response to ACAS warning				V	<u> </u>	<u> </u>
131	Rate of electrical power system failures/flight	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology		V			V	



	Safety Performance	_		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
132		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution		٧			٧	
133		Pilot tiredness - Inadequate workload distribution		٧			V	
134		Flaws in pilot requirements definition process and/or training methodology		٧			V	
135		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.		V			V	
136		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fuel system components		V				
137		Flaws in aircraft system maintenance process definition - Fuel system compoonents		V				
138		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components		V				
139		Flaws in manufacturer quality control process - Engine systems and / or components		V				
140		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components		V			V	
141		Flaws in aircraft system maintenance process definition - APU systems and / or components		٧			٧	
142		Inadequate aircraft de-icing / anti-icing		V			V	
143		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties		V			٧	
144		Flaws in aircraft system maintenance process definition - Electrical wiring System		٧			V	
145		Flaws in manufacturer quality control process - APU systems and / or components		٧			٧	
146		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.		V			٧	
147		Flaws in aircraft system maintenance process definition - Components of Wing control surface system.		٧			V	
148		Flaws in manufacturer quality control process - Components of Wing control surface system.		V			V	
149		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		V			٧	
150		Lack of adherence to SOP in terms of de-icing / anti-icing procedures.		٧			٧	
151		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components		V			V	
152		Flaws in aircraft system maintenance process definition - Hydraulic System		٧			V	
153		Inadequate de-icing method applied		٧				
154		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		٧				
155		Incorrect use of automation -Engine anti-ice system		٧				



	Safety Performance	<u>_</u>		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
156		Aggressive maneuvering / overcontrolling		٧				
157		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Compressor in the engine		٧				
158		Flaws in manufacturer quality control process - Compressor in the engine.		٧				
159		Flaws in aircraft system maintenance process definition - Compressor in the engine.		٧			<u></u>	
160		Flaws in manufacturer quality control process - Engine accessory drive components.		٧			<u></u>	
161		Flaws in aircraft system maintenance process definition - Engine accessory drive components.		٧				
162		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine accessory drive components.		٧			<u> </u>	
163		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ECAM (or similar) system components.		V			<u> </u>	
164		Flaws in aircraft system maintenance process definition - ECAM (or similar) system components.		٧				
165		Unintuitive and / or error prone system manual - Engine anti-icing system		٧				
166		Lack of adherence to the SOP in terms of critical indicators cross-checking		٧				
167		Lack of adherence to SOP in terms of AFM limitations		٧				
168		Lack of adherence to SARPs in terms of avoiding adverse weather conditions during flight		٧				
169		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ECAM.		V				
170		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Integrity of primary aircraft structure.		V				
171		Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.		V				
172		Flaws in manufacturer quality control process - Integrity of primary aircraft structure.		٧				
173		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Reduction gear in the engine		٧				
174		Flaws in manufacturer quality control process - Reduction gear in the engine.		V				
175		Flaws in aircraft system maintenance process definition - Reduction gear in the engine.		٧			_	
176		Flaws in manufacturer quality control process - ECAM (or similar) system components.		٧				
177		Lack of adherence to emergency procedures - Fuel starvation		٧				
178		Flaws in manufacturer quality control process - Fuel system components.		٧				
179		Flaws in manufacturer quality control process - Landing gear components.		٧				
180		Flaws in aircraft system maintenance process definition - Landing gear components.		٧				



	Safety Performance	<u>_</u>		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
181		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring		٧				
182		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine anti-ice systems and / or components		V				
183		Flaws in manufacturer quality control process - Engine anti-ice system and / or components		٧				
184		Flaws in aircraft system maintenance process definition - Engine anti-ice system and / or components		٧				
185		Flaws in aircraft system maintenance process definition - Oil distribution system		V				
186		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Oil distribution system		V				
187		Flaws in manufacturer quality control process - Oil distribution system		V				
188		Flaws in aircraft system maintenance process definition - Engine combustor		٧				
189		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine combustor		V				
190		Flaws in manufacturer quality control process - Engine combustor		V				
191		Flaws in aircraft system maintenance process definition - Engine turbine components		V				
192		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine turbine components		٧				
193		Flaws in manufacturer quality control process - Engine turbine components		V				
194		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components		٧			٧	
195		Flaws in aircraft system maintenance process definition - Fire detection system components		V			٧	
196		Flaws in manufacturer quality control process - Fire detection system components		٧			V	
197		Flaws in aircraft system maintenance process definition - Fire warning system		V			V	
198		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system		V			V	
199		Flaws in manufacturer quality control process - Fire warning system		V			V	
200		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Electrical / wiring system components		V				
201		Flaws in manufacturer quality control process - Electrical / wiring systems components		V				
202		Inadequate maintenance of fire vulnerable aircraft parts or components		٧				
203		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements in terms of fire resistance		V				
204		Lack of adherence to SOP in terms of fuelling procedure		V				İ



	Safety Performance			Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
205		Lack of adherence to regulations concerning transport of DGR goods		٧				
206		Separation of structural element / component of the aircraft during take-off or landing		٧				
207		Lack of adherence to engine limitations		V				
208		Flaws in aircraft system maintenance process definition - Engine systems and / or components		V				
209		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of fire detection / warning or / and extinguishing system.		V				
210		Flaws in manufacturer quality control process - Power supply system components		V			V	
211		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components		V			V	
212		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components					V	
213		Flaws in aircraft system maintenance process definition - Fire extinguishing system components		V			٧	
214		Flaws in manufacturer quality control process - Fire extinguishing system components		V			٧	
215		Lack of adherence to SOP in terms of awareness on supporting systems warning		٧				
216		Unintuitive and / or error prone system manual - ECAM		V				
217		Flaws in manufacturer quality control process - Engine sensors		V				
218		Flaws in aircraft system maintenance process definition - Engine sensors		V				
219		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine sensors		٧				
220		Lack of adherence to AFM in terms of emergency procedures - engine restart procedure		V				
221		Lack of adherence to AFM in terms of emergency procedures - fire detection and extinguishing procedure		V				
222		Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.					٧	
223		Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.					V	
224		Unintuitive and / or error prone system manual - FMC					٧	
225		Incorrect stab-trim setting					٧	
226		Undetected incorrect takeoff configuration					٧	
227		Inadequate effectivenes of fire extinguishing system		٧				
228		Unintuitive and / or error prone system manual - fire extinguishing system		٧				
229		Incorrect use of automation - TOCW System					٧	



	Safety Performance			Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
230		Flaws in aircraft system maintenance process definition - TOCW System					٧	
231		Unintuitive and / or error prone system manual - TOCW					٧	
232		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System					٧	
233		Unintuitive and / or error prone system manual - CPCS					V	1
234		Flaws in aircraft system maintenance process definition - stickshaker		٧			V	
235		Lack of or poor communication quality					V	
236		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - stickshaker system components		V			V	
237		Lack of adherence to SOP in terms of awareness on supporting systems warning - stickshaker		٧			V	
238		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.					٧	
239		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.					V	
240		Flaws in manufacturer quality control process - Communication equipment systems and components.					٧	
241		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)					V	
242		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)					٧	
243		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine					V	
244		Navigation deviation					V	1
245		Flaws in manufacturer quality control process - Autothrottle system in the engine.					٧	
246		Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.					٧	
247		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)					V	
248		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components					V	
249		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.					٧	
250		Flaws in manufacturer quality control process - Onboard navigational systems and components.					V	
251		Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing					٧	
252		Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.					V	
253		Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT)					V	
254		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance					V	



	Safety Performance			Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
		with requirements - antiice fluid HOT						
255		Applied de-icing / anti-icing method is not sufficient for predicted conditions					٧	
256		Lack of adherence to SOP in terms of aircraft icing (condition) monitoring					٧	
257		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					٧	
258		Poor application of T/O & RTO procedure, failure recognition and preparedness					٧	
259		Lack of adherence to AFM in terms of emergency procedures - stall recovery		٧			V	
260		Lack of adherence to AFM in terms of emergency procedures - engine failure		٧			<u> </u>	
261		Inadequate stall recovery procedure for the aircraft					٧	
262		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment					٧	
263		Poor application of T/O & RTO procedure, braking initiation sequence					٧	
264		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum					V	
265		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.					٧	
266		Error in calculation of necessary amount of fuel		٧			<u> </u>	
267		Poor application of T/O & RTO procedure, computation of T/O parameters					V	
268		Flaws in manufacturer quality control process - Stickshaker system components					٧	
131	Rate of flight control system failures/flight	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology		V	V	V	V	
132		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution		٧	٧	V	٧	
133		Pilot tiredness - Inadequate workload distribution		٧	V	V	V	
134		Flaws in pilot requirements definition process and/or training methodology		٧	V	V	V	
135		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties		V	V	V	V	
136		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)		V	V	V	V	
137		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)		٧	V	٧	٧	
138		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)		٧	٧	٧	٧	
139		Lack of adherence to the SOP in terms of critical indicators cross-checking		٧	V			
140		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components			V	٧	٧	
141		Flaws in manufacturer quality control process - Onboard navigational systems and components.			V	٧	٧	



	Safety Performance			Ор	eration	ıal issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
142		Lack of or poor communication quality			V	V	٧	
143		Traffic controller tiredness - Inadequate workload distribution			V	V		
144		Flaws in traffic controller requirements definition process and/or training methodology			٧	V		
145		Lack of English proficiency			٧	V		
146		Use of non-standard phraseology by pilot and/or controller			٧	V		
147		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver			V	V		
148		Altimeter setting error			V	V		
149		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.		V			V	
150		Inadequate aircraft de-icing / anti-icing		٧			V	
151		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.			V	V	٧	
152		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).		V	V			
153		Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination		V	V			
154		Incorrect use of automation - FMS		٧	V			
155		Unintuitive and / or error prone system manual - FMS		٧	V			
156		Flaws in manufacturer quality control process - Fire extinguishing system components		٧		V	V	
157		Lack of adherence to SOP in terms of de-icing / anti-icing procedures.		V			V	
158		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fuel system components		V				
159		Flaws in aircraft system maintenance process definition - Fuel system components		V				
160		Failure to check navigation accuracy before approach			V			
161		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. Navigational aid failure.			V			
162		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components		V				
163		Not recognized ground Navaids System failure not reflected in NOTAM messages			٧			
164		Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS)			٧			
165		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS)			V			
166		Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS)			٧			



	Safety Performance	_		Op	eration	al issu	al issue		
No.	Indicators	Precursors	1	2	3	4	5	6	
167		Current airport diagram not reflecting critical changes			V				
168		Lack of adherence to SOP in terms of approach and landing			V				
169		Lack of adherence to SOP for AIR operations in terms of controller error in approach clearence instruction			٧				
170		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		V			V		
171		Flaws in CRM training procedures			V		1		
172		Lack of adherence to the main CRM rules			V				
173		Flaws in manufacturer quality control process - Engine systems and / or components		٧					
174		Flaws in aircraft system maintenance process definition - Electrical wiring System		٧			V		
175		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components		V			V		
176		Flaws in aircraft system maintenance process definition - APU systems and / or components		٧			٧		
177		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.				٧	V		
178		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.				V	V		
179		Flaws in manufacturer quality control process - Communication equipment systems and components.				V	V		
180		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.		V			V		
181		Flaws in aircraft system maintenance process definition - Components of Wing control surface system.		٧			٧		
182		Flaws in manufacturer quality control process - Components of Wing control surface system.		٧			V		
183		Navigation deviation				V	V		
184		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components		V			V		
185		Flaws in aircraft system maintenance process definition - Hydraulic System		٧			٧		
186		Flaws in aircraft system maintenance process definition - Fire warning system		٧			٧		
187		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system		V			V		
188		Flaws in manufacturer quality control process - Fire warning system		٧			٧		
189		Flaws in aircraft system maintenance process definition - Fire detection system components		٧			٧		
190		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components		V			V		



	Safety Performance			Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
191		Flaws in manufacturer quality control process - Fire detection system components		٧			٧	
192		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		٧			٧	
193		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring		٧			٧	
194		Aggressive maneuvering / overcontrolling		٧				
195		Difference indications of independent aircraft speed / altitude or attitude indicators		٧				
196		Unintuitive and / or error prone system manual - CPCS					V	
197		Flaws in manufacturer quality control process - APU systems and / or components		٧				
198		Incorrect or confusing / misleading ATC instructions				V	- 	
199		Hearback ommitted				V		
200		Excessive bank angle		٧			 	
201		Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.					٧	
202		Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.					V	
203		Incorrect stab-trim setting					V	
204		Lack of adherence to SOP for take-off procedure in terms of altimeter callibration.				V		
205		Lack of adherence to Rules of the Air - adherence to Controller clearance				V		
206		Tactical or / and Planning Controller tiredness - Inadequate workload distribution				V		
207		Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology				V		
208		Unintuitive and / or error prone system manual - communication equipment.				V		
209		Altitude deviation				V		
210		Level bust (pilot lapse or late re-clearance by ATC)				V		
211		Failure to comply with an altitude or speed restriction / constraint				V		
212		Inadequate coordination between ATM centers and/or ATC sectors				V		
213		Flaws in Airspace and Air Traffic planning procedures design process				V		
214		Flaws in conflict and separation minima infringement detection / elimination procedures				٧		
215		Lack of adherence of airlines to time contraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data.				V		
216		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MTCD System				V		



	Safety Performance			Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
217		Lack of adherence of airlines to declared Flight Plan.				٧		
218		Failure to identify the pre-tactical conflict before it reach the tactical controller				V		
219		Lack of adherence to SOP for Airborne operation in terms of minimum seprataion				٧		
220		Incorrect use of communication equipment				٧		
221		Military activity in controlled airport or located within controlled area				V		
222		General aviation activity in controlled airport or located within controlled area				٧		
223		Intensified traffic related to general aviation activity e. g. over GA airport / airfield				٧		
224		Deviation from flight trajectory commanded by controller				٧		
225		Lack of adherence to SOP in terms of fuelling procedure		٧				
226		Imbalanced and inaproppriate relation between cpt and his subordinates			V			
227		Inadequate maintenance of fire vulnerable aircraft parts or components		V				
228		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements in terms of fire resistance		V				
229		Lack of adherence to regulations concerning transport of DGR goods		V				
230		Separation of structural element / component of the aircraft during take-off or landing		V				
231		Lack of adherence to engine limitations		٧				
232		Flaws in aircraft system maintenance process definition - Engine systems and / or components		٧				
233		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Electrical / wiring system components		٧				
234		Flaws in manufacturer quality control process - Electrical / wiring systems components		V				
235		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components		V			٧	
236		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of fire detection / warning or / and extinguishing system.		٧				
237		Flaws in aircraft system maintenance process definition - Fire extinguishing system components		V			V	1
238		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components					V	
239		Flaws in manufacturer quality control process - Power supply system components					٧	
240		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FCS system or components		V			V	
241		Flaws in manufacturer quality control process - FCS system components		V			V	1



	Safety Performance	_		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
242		Flaws in aircraft system maintenance process definition - FCS systems or components		٧			٧	
243		Excessive pitch attitude		V				
244		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ECAM (or similar) system components.		V				
245		Flaws in aircraft system maintenance process definition - ECAM (or similar) system components.		٧				
246		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ECAM.		٧				
247		Flaws in manufacturer quality control process - ECAM (or similar) system components.		٧				
248		Flaws in manufacturer quality control process - Fuel system components.		V				
249		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Anti-icing system components		V				
250		Flaws in manufacturer quality control process - Anti-icing system components		V				
251		Flaws in aircraft system maintenance process definition - Anti-icing systems components		٧				
252		Inadequate de-icing method applied		V				
253		Incorrect use of automation -Engine anti-ice system		٧				
254		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Compressor in the engine		V				
255		Flaws in manufacturer quality control process - Compressor in the engine.		V				
256		Flaws in aircraft system maintenance process definition - Compressor in the engine.		٧				
257		Flaws in manufacturer quality control process - Engine accessory drive components.		٧				
258		Flaws in aircraft system maintenance process definition - Engine accessory drive components.		٧				
259		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine accessory drive components.		V				
260		Unintuitive and / or error prone system manual - Engine anti-icing system		V				
261		Lack of adherence to SOP in terms of AFM limitations		٧				
262		Lack of adherence to SARPs in terms of avoiding adverse weather conditions during flight		٧				
263		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Integrity of primary aircraft structure.		V				
264		Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.		٧				
265		Flaws in manufacturer quality control process - Integrity of primary aircraft structure.		٧				
266		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Reduction gear in the engine		V				



	Safety Performance	_		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
267		Flaws in manufacturer quality control process - Reduction gear in the engine.		٧				
268		Flaws in aircraft system maintenance process definition - Reduction gear in the engine.		V				
269		Lack of adherence to emergency procedures - Fuel starvation		V				
270		Flaws in manufacturer quality control process - Landing gear components.		V				
271		Flaws in aircraft system maintenance process definition - Landing gear components.		V				
272		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine anti-ice systems and / or components		V				
273		Flaws in manufacturer quality control process - Engine anti-ice system and / or components		V				
274		Flaws in aircraft system maintenance process definition - Engine anti-ice system and / or components		٧				
275		Flaws in aircraft system maintenance process definition - Oil distribution system		V				
276		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Oil distribution system		V				
277		Flaws in manufacturer quality control process - Oil distribution system		V				
278		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine		V			V	
279		Flaws in manufacturer quality control process - Autothrottle system in the engine.		V			٧	
280		Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.		٧			٧	
281		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of STCA System.				٧		
282		Lack of adherence to regulations concerning independent ATCO monitoring				٧		
283		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - STCA System				V		
284		Lack of adherence to AFM in terms of emergency procedures - fire detection and extinguishing procedure		V				
285		Unintuitive and / or error prone system manual - FMC					V	
286		Lack of adherence to SOP in terms of aircraft icing (condition) monitoring		V			V	
287		Undetected incorrect takeoff configuration					٧	
288		Lack of adherence to AFM in terms of emergency procedures - stall recovery		٧			٧	
289		Flaws in aircraft system maintenance process definition - ADI system components		٧				
290		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ADI system components		V				
291		Flaws in manufacturer quality control process - ADI system components		V				



	Safety Performance	_		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
292		Flaws in aircraft system maintenance process definition - TOCW System					٧	
293		Inadequate effectivenes of fire extinguishing system		٧				
294		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System					V	
295		Slow rotation (i.e., low pitch rate)					V	
296		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Pitot static system components		V				
297		Flaws in manufacturer quality control process - Pitot static system components		V			1	
298		Flaws in aircraft system maintenance process definition - Pitot static systems components		٧				
299		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ADI		V				
300		Flaws in manufacturer quality control process - ADI		V				
301		Flaws in aircraft system maintenance process definition - ADI		٧				
302		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ASI		V				
303		Flaws in manufacturer quality control process - ASI		٧				
304		Flaws in aircraft system maintenance process definition - ASI		V				
305		Flaws in aircraft system maintenance process definition - Engine combustor		٧				
306		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine combustor		V				
307		Flaws in manufacturer quality control process - Engine combustor		V			1	
308		Flaws in aircraft system maintenance process definition - Engine turbine components		٧				
309		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine turbine components		V				
310		Flaws in manufacturer quality control process - Engine turbine components		V				
311		Unintuitive and / or error prone system manual - fire extinguishing system		٧				
312		Incorrect use of automation - TOCW System					٧	
313		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					٧	
314		Poor application of T/O & RTO procedure, failure recognition and preparedness					٧	
315		Unintuitive and / or error prone system manual - TOCW					٧	
316		Lack of adherence to the SOP in terms of critical maneuvre execution		V				



	Safety Performance			Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
317		Lack of adherence to SOP in terms of safety best practices		٧				
318		Lack of adherence to SOP in terms of pre-flight inspections -presence of anti-contamination covers on pitot static tube		٧				
319		Lack of adherence to SOP in terms of briefing and checklist before initiating of start of taxiing and take-off		٧				
320		Lack of adherence to SOP for take-off procedure in terms of speed bug checklist preparation and verification.					٧	
321		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PFD		٧				
322		Flaws in manufacturer quality control process - PFD		V			<u> </u>	
323		Flaws in aircraft system maintenance process definition - PFD		٧			<u> </u>	
324		Lack of adherence to emergency procedures - recovery from severe FCS failure		V			<u> </u>	
325		Flaws in aircraft system maintenance process definition - stickshaker		V			٧	
326		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - stickshaker system components		٧			V	
327		Lack of adherence to SOP in terms of awareness on supporting systems warning - stickshaker		V			٧	
328		Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing					٧	
329		Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.					٧	
330		Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT)					٧	
331		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - antiice fluid HOT					V	
332		Applied de-icing / anti-icing method is not sufficient for predicted conditions					٧	
333		Incorrect use of automation - Anti-icing system		V				
334		Unintuitive and / or error prone system manual - Anti-icing system		V				
335		Flight below maneuvering speeds		٧				
336		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Rudder components.		٧				
337		Flaws in aircraft system maintenance process definition - Rudder components.		V				
338		Flaws in manufacturer quality control process - Rudder components.		٧				
339		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Horizontal stabilizer components.		V	_			
340		Flaws in aircraft system maintenance process definition - Horizontal stabilizer components.		٧				
341		Flaws in manufacturer quality control process - Horizontal stabilizer components.		V				



	Safety Performance			Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
342		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Thrust reverse system in the engine.		V				
343		Flaws in manufacturer quality control process - Thrust reverse system in the engine.		٧				<u> </u>
344		Flaws in aircraft system maintenance process definition - Thrust reverse system in the engine.		٧				<u> </u>
345		Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain)			V			
346		Premature descent to DA(H) before G/S intercept or premature descent to MDA(H) before final-descent-point / FAF			V			
347		Premature descent below MDA(H) before reaching the visual-descent-point (VDP)			V			
348		Flight below desired flight path during initial and/or final approach			V			
349		Continued approach, when below DA(H) or MDA(H), after loss of visual references			V			
350		Late or inadequate response to MSAW warning			V			
351		Failure to go-around, when so required			V			
352		Failure to follow published missed-approach procedure			V			
353		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.			V			
354		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of MSAW system.			V			<u> </u>
355		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MSAW System			V			
356		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. MSAW warning.			V			
357		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment					V	
358		Poor application of T/O & RTO procedure, braking initiation sequence					V	
359		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum					٧	
360		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.					V	l
361		Use of non-standard phraseology by pilot flying (PF) and/or pilot not flying (PNF)		٧				
362		Poor application of T/O & RTO procedure, computation of T/O parameters					٧	
363		Poor application of T/O & RTO procedure, aircraft handling					V	
364		Lack of adherence to AFM in terms of emergency procedures - engine restart procedure		٧				
365		Lack of adherence to the current technology standards in terms of flight safety and efficiency - engines location.		٧				
366		Flaws in manufacturer quality control process - Engine sensors		٧				
367		Flaws in aircraft system maintenance process definition - Engine sensors		٧				



	Safety Performance			Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
368		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine sensors		V				
369		Inadequate stall recovery procedure for the aircraft					V	
370		Unintuitive and / or error prone system manual - ground radar.					V	
371		Flaws in manufacturer quality control process - TOCW system components					V	
372		Lack of adherence to SOP in terms of awareness on supporting systems warning		٧				
373		Flaws in manufacturer quality control process - Stickshaker system components					V	
374		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ACAS system components				٧		
375		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS			V			
376		Inappropriate visual avoidance maneuver				V		
377		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ACAS installed on aircraft.				٧		
378		Late or inadequate response to ACAS warning				V		
379		Unintuitive and / or error prone system manual - ECAM		٧				
380		Flaws in aircraft system maintenance process definition - GPWS system components			٧			
381		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - GPWS system components			V			
382		Flaws in manufacturer quality control process - GPWS system components			V			
131	Rate of fuel system failures/flight	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology		V			٧	
132		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution		٧			V	
133		Pilot tiredness - Inadequate workload distribution		٧			٧	
134		Flaws in pilot requirements definition process and/or training methodology		٧			V	
135		Flaws in aircraft system maintenance process definition - Fuel system compoonents		٧				
136		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fuel system components		V				
137		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.		٧			٧	
138		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components		V				
139		Flaws in manufacturer quality control process - Engine systems and / or components		٧				



	Safety Performance			Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
140		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components		V			V	
141		Flaws in aircraft system maintenance process definition - APU systems and / or components		V			V	
142		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components		V			V	
143		Flaws in aircraft system maintenance process definition - Hydraulic System		V			V	
144		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components		V			V	
145		Flaws in aircraft system maintenance process definition - Fire detection system components		V			V	
146		Flaws in manufacturer quality control process - Fire detection system components		V			V	
147		Flaws in aircraft system maintenance process definition - Fire warning system		V			V	
148		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system		V			٧	
149		Flaws in manufacturer quality control process - Fire warning system		V			٧	
150		Lack of adherence to SOP in terms of fuelling procedure		V				
151		Separation of structural element / component of the aircraft during take-off or landing		٧				
152		Flaws in manufacturer quality control process - APU systems and / or components		٧				
153		Flaws in aircraft system maintenance process definition - Electrical wiring System		٧				
154		Inadequate maintenance of fire vulnerable aircraft parts or components		٧				
155		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements in terms of fire resistance		V				
156		Lack of adherence to regulations concerning transport of DGR goods		٧				
157		Lack of adherence to engine limitations		V				
158		Flaws in aircraft system maintenance process definition - Engine systems and / or components		V				
159		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Electrical / wiring system components		V				
160		Flaws in manufacturer quality control process - Electrical / wiring systems components		٧				
161		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties		V				
162		Inadequate aircraft de-icing / anti-icing		٧			V	
163		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of fire detection / warning or / and extinguishing system.		V				



	Safety Performance	_		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
164		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.		V			V	
165		Flaws in aircraft system maintenance process definition - Components of Wing control surface system.		٧			V	
166		Flaws in manufacturer quality control process - Components of Wing control surface system.		٧			V	
167		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		V			٧	
168		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components		V			V	
169		Flaws in aircraft system maintenance process definition - Fire extinguishing system components		٧			V	
170		Flaws in manufacturer quality control process - Fire extinguishing system components		٧			٧	
171		Flaws in manufacturer quality control process - Fuel system components.		٧				
172		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ECAM (or similar) system components.		V				
173		Lack of adherence to the SOP in terms of critical indicators cross-checking		٧				
174		Flaws in aircraft system maintenance process definition - ECAM (or similar) system components.		٧				
175		Flaws in manufacturer quality control process - ECAM (or similar) system components.		٧				
176		Lack of adherence to emergency procedures - Fuel starvation		٧				
177		Inadequate de-icing method applied		٧				
178		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		٧				
179		Incorrect use of automation -Engine anti-ice system		٧				
180		Aggressive maneuvering / overcontrolling		V				
181		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Compressor in the engine		V				
182		Flaws in manufacturer quality control process - Compressor in the engine.		V				
183		Flaws in aircraft system maintenance process definition - Compressor in the engine.		٧				
184		Flaws in manufacturer quality control process - Engine accessory drive components.		V				
185		Flaws in aircraft system maintenance process definition - Engine accessory drive components.		٧				
186		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine accessory drive components.		V				
187		Unintuitive and / or error prone system manual - Engine anti-icing system		٧				
188		Lack of adherence to SOP in terms of AFM limitations		٧				



	Safety Performance	_		Operational issue						
No.	Indicators	Precursors	1	2	3	4	5	6		
189		Lack of adherence to SOP in terms of de-icing / anti-icing procedures.		٧						
190		Lack of adherence to SARPs in terms of avoiding adverse weather conditions during flight		٧						
191		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ECAM.		V						
192		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Integrity of primary aircraft structure.		V						
193		Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.		V						
194		Flaws in manufacturer quality control process - Integrity of primary aircraft structure.		V						
195		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Reduction gear in the engine		V						
196		Flaws in manufacturer quality control process - Reduction gear in the engine.		V						
197		Flaws in aircraft system maintenance process definition - Reduction gear in the engine.		V						
198		Flaws in manufacturer quality control process - Landing gear components.		V						
199		Flaws in aircraft system maintenance process definition - Landing gear components.		V						
200		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring		V						
201		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine anti-ice systems and / or components		V						
202		Flaws in manufacturer quality control process - Engine anti-ice system and / or components		٧						
203		Flaws in aircraft system maintenance process definition - Engine anti-ice system and / or components		V						
204		Flaws in aircraft system maintenance process definition - Oil distribution system		V						
205		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Oil distribution system		V						
206		Flaws in manufacturer quality control process - Oil distribution system		٧						
207		Lack of adherence to AFM in terms of emergency procedures - fire detection and extinguishing procedure		٧						
208		Inadequate effectivenes of fire extinguishing system		V						
209		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine fuel distribution system		V						
210		Flaws in manufacturer quality control process - Engine fuel distribution system		٧						
211		Flaws in aircraft system maintenance process definition - Engine fuel distribution system		٧						
212		Unintuitive and / or error prone system manual - fire extinguishing system		٧						
213		Flaws in aircraft system maintenance process definition - Engine combustor		٧						



	Safety Performance		T	Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
214		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine combustor		V				
215		Flaws in manufacturer quality control process - Engine combustor		V			<u> </u>	
216		Flaws in aircraft system maintenance process definition - Engine turbine components		V			<u> </u>	
217		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine turbine components		٧				
218		Flaws in manufacturer quality control process - Engine turbine components		٧			<u> </u>	
219		Unintuitive and / or error prone system manual - CPCS					V	
220		Lack of or poor communication quality					V	
221		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components					V	
222		Flaws in manufacturer quality control process - Power supply system components					V	
223		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.					V	
224		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.					V	
225		Flaws in manufacturer quality control process - Communication equipment systems and components.					V	
226		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)					V	
227		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)					V	
228		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine					V	
229		Navigation deviation					V	
230		Flaws in manufacturer quality control process - Autothrottle system in the engine.					V	
231		Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.					V	
232		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)					٧	
233		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components					V	
234		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.					V	
235		Flaws in manufacturer quality control process - Onboard navigational systems and components.					٧	
236		Lack of adherence to AFM limitations for Take-off		٧				
237		Lack of adherence to SOP in terms of load sheet preparation and verification		٧				



	Safety Performance			Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
238		Lack of adherence to the current technology standards in terms of flight safety and efficiency - fuel tank allocation.		٧				
239		Lack of adherence to SOP in terms of AFM limitations in terms of weigh and balance		٧				
240		Lack of adherence to SOP in terms of pre-flight inspections - cargo securing quality		V			1	
241		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					٧	
242		Poor application of T/O & RTO procedure, failure recognition and preparedness					V	
243		Lack of adherence to AFM in terms of emergency procedures - stall recovery		٧				
244		Lack of adherence to the current technology standards in terms of flight safety and efficiency - engines location.		٧				
245		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment					V	
246		Poor application of T/O & RTO procedure, braking initiation sequence					V	
247		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum					V	
248		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.					V	
249		Poor application of T/O & RTO procedure, computation of T/O parameters					V	
250		Lack of adherence to AFM in terms of emergency procedures - engine restart procedure		V			1	
251		Flaws in manufacturer quality control process - Engine sensors		٧				
252		Flaws in aircraft system maintenance process definition - Engine sensors		V			1	
253		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine sensors		٧				
131	Rate of hydraulic power system failure/flight	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	V	V			V	
132		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	V	V			V	
133		Pilot tiredness - Inadequate workload distribution	٧	V			V	
134		Flaws in pilot requirements definition process and/or training methodology	٧	V			V	
135		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components		V			V	
136		Flaws in aircraft system maintenance process definition - Hydraulic System		V			V	
137		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance					 	
138		with requirements - APU systems and / or components		V			V	
139		Flaws in aircraft system maintenance process definition - APU systems and / or components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance		V			V	
133		with requirements - Fire deection system components		٧			٧	



	Safety Performance	_		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
140		Flaws in aircraft system maintenance process definition - Fire detection system components		٧			٧	
141		Flaws in manufacturer quality control process - Fire detection system components		٧			V	
142		Flaws in aircraft system maintenance process definition - Fire warning system		V			V	
143		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system		V			V	
144		Flaws in manufacturer quality control process - Fire warning system		٧			٧	
145		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.		٧			٧	
146		Lack of adherence to SOP in terms of fuelling procedure		V				
147		Flaws in aircraft system maintenance process definition - Electrical wiring System		V				
148		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fuel system components		V				
149		Inadequate maintenance of fire vulnerable aircraft parts or components		V				
150		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements in terms of fire resistance		V				
151		Lack of adherence to regulations concerning transport of DGR goods		٧				
152		Separation of structural element / component of the aircraft during take-off or landing		٧				
153		Flaws in aircraft system maintenance process definition - Fuel system compoonents		V				
154		Lack of adherence to engine limitations		٧				
155		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components		V				
156		Flaws in manufacturer quality control process - Engine systems and / or components		V				
157		Flaws in aircraft system maintenance process definition - Engine systems and / or components		V				
158		Flaws in manufacturer quality control process - APU systems and / or components		٧				
159		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Electrical / wiring system components		V				
160		Flaws in manufacturer quality control process - Electrical / wiring systems components		٧				
161		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of fire detection / warning or / and extinguishing system.		V				
162		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components		V			V	
163		Flaws in aircraft system maintenance process definition - Fire extinguishing system components		V			V	



	Safety Performance			Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
164		Flaws in manufacturer quality control process - Fire extinguishing system components		٧			٧	
165		Lack of or poor communication quality	٧				٧	
166		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.		V			V	
167		Flaws in aircraft system maintenance process definition - Components of Wing control surface system.		V			V	
168		Flaws in manufacturer quality control process - Components of Wing control surface system.		٧			٧	
169		Lack of adherence to AFM in terms of emergency procedures - fire detection and extinguishing procedure		V				
170		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)		V			V	
171		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)		V			V	
172		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine		V			V	
173		Flaws in manufacturer quality control process - Autothrottle system in the engine.		V			٧	
174		Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.		٧			٧	
175		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)		V			V	
176		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	V	٧				
177		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake)	V					
178		Inadequate effectivenes of fire extinguishing system		V				
179		Unintuitive and / or error prone system manual - fire extinguishing system		٧				
180		Inadvertent deviation from cleared taxi route	٧					
181		Lack of English proficiency	V					
182		Incorrect or confusing / misleading ATC instructions	V					
183		Use of non-standard phraseology by pilot and/or controller	V					
184		Traffic controller tiredness - Inadequate workload distribution	V					
185		Lack of adherence to SOP for GND movements. Poor execution of parking / docking /pushback procedure	V					
186		Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications	V					
187		Lack of adherence to SOP for GND movements.	V					
188		Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.	V				_ _	



	Safety Performance			Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
189		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence	V					
190		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity	V					
191		Flaws in traffic controller requirements definition process and/or training methodology	V					
192		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	V				<u> </u>	
193		Current airport diagram not reflecting critical changes	٧					
194		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment	V					
195		Unintuitive and / or error prone system manual - CPCS					V	
196		Inadequate aircraft de-icing / anti-icing					V	
197		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components					V	
198		Flaws in manufacturer quality control process - Power supply system components					V	
199		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.					V	
200		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.					V	
201		Flaws in manufacturer quality control process - Communication equipment systems and components.					V	
202		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Rudder components.		٧				
203		Flaws in aircraft system maintenance process definition - Rudder components.		V				
204		Flaws in manufacturer quality control process - Rudder components.		V				
205		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Horizontal stabilizer components.		٧				
206		Flaws in aircraft system maintenance process definition - Horizontal stabilizer components.		V				
207		Flaws in manufacturer quality control process - Horizontal stabilizer components.		٧				
208		Navigation deviation					٧	
209		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components					V	
210		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components				_	٧	
211		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.					V	
212		Flaws in manufacturer quality control process - Onboard navigational systems and components.					V	



	Safety Performance			Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
213		Lack of adherence to emergency procedures - RWY collision avoidance	V					
214		Flight below maneuvering speeds		V				
215		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					٧	
216		Poor application of T/O & RTO procedure, failure recognition and preparedness					V	
217		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Thrust reverse system in the engine.		٧				
218		Flaws in manufacturer quality control process - Thrust reverse system in the engine.		V			<u> </u>	
219		Flaws in aircraft system maintenance process definition - Thrust reverse system in the engine.		٧				
220		Lack of adherence to emergency procedures - recovery from severe FCS failure		V			<u> </u>	
221		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment					V	
222		Poor application of T/O & RTO procedure, braking initiation sequence					V	
223		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum					V	
224		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.					V	
225		Lack of adherence to the SOP in terms of critical indicators cross-checking		V			<u> </u>	
226		Poor application of T/O & RTO procedure, computation of T/O parameters					V	
131	Rate of ice/rain protection system failures/flight	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology		٧			V	
132		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution		V			V	
133		Pilot tiredness - Inadequate workload distribution		V			V	
134		Flaws in pilot requirements definition process and/or training methodology		V			V	
135		Inadequate aircraft de-icing / anti-icing		V			٧	
136		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties		٧			V	
137		Lack of adherence to the SOP in terms of critical indicators cross-checking		V			<u> </u>	
138		Lack of adherence to SOP in terms of de-icing / anti-icing procedures.		V			٧	
139		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.		٧			٧	
140		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		٧			V	
141		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring		V			 	



	Safety Performance	<u>_</u>		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
142		Lack of adherence to SARPs in terms of avoiding adverse weather conditions during flight		٧				
143		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.		V			V	
144		Flaws in aircraft system maintenance process definition - Components of Wing control surface system.		٧			٧	
145		Flaws in manufacturer quality control process - Components of Wing control surface system.		٧			V	
146		Aggressive maneuvering / overcontrolling		٧				
147		Lack of adherence to SOP in terms of AFM limitations		٧				
148		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Integrity of primary aircraft structure.		V				
149		Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.		V			<u> </u>	
150		Flaws in manufacturer quality control process - Integrity of primary aircraft structure.		٧				
151		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		٧				
152		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fuel system components		V				
153		Flaws in aircraft system maintenance process definition - Fuel system components		V				
154		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine anti-ice systems and / or components		V				
155		Flaws in manufacturer quality control process - Engine anti-ice system and / or components		V				
156		Flaws in aircraft system maintenance process definition - Engine anti-ice system and / or components		٧				
157		Incorrect use of automation -Engine anti-ice system		٧				
158		Flaws in manufacturer quality control process - Fuel system components.		٧				
159		Unintuitive and / or error prone system manual - Engine anti-icing system		٧				
160		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Reduction gear in the engine		V				
161		Flaws in manufacturer quality control process - Reduction gear in the engine.		٧				
162		Flaws in aircraft system maintenance process definition - Reduction gear in the engine.		٧				
163		Lack of adherence to emergency procedures - Fuel starvation		٧				
164		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components		V				
165		Inadequate de-icing method applied		٧				
166		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance		٧				



	Safety Performance	_		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
		with requirements - Compressor in the engine						
167		Flaws in manufacturer quality control process - Compressor in the engine.		٧				
168		Flaws in aircraft system maintenance process definition - Compressor in the engine.		٧				
169		Flaws in manufacturer quality control process - Engine accessory drive components.		٧				
170		Flaws in aircraft system maintenance process definition - Engine accessory drive components.		٧				
171		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine accessory drive components.		V				
172		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ECAM (or similar) system components.		V				
173		Flaws in aircraft system maintenance process definition - ECAM (or similar) system components.		٧				<u> </u>
174		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ECAM.		V				
175		Flaws in manufacturer quality control process - ECAM (or similar) system components.		٧				
176		Flaws in manufacturer quality control process - Landing gear components.		٧				
177		Flaws in aircraft system maintenance process definition - Landing gear components.		٧				
178		Flaws in aircraft system maintenance process definition - Oil distribution system		٧				
179		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Oil distribution system		V				
180		Flaws in manufacturer quality control process - Oil distribution system		٧				
181		Flaws in manufacturer quality control process - Engine systems and / or components		٧				
182		Flaws in aircraft system maintenance process definition - Engine combustor		٧				
183		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine combustor		V				
184		Flaws in manufacturer quality control process - Engine combustor		٧				<u> </u>
185		Flaws in aircraft system maintenance process definition - Engine turbine components		٧				
186		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine turbine components		V				
187		Flaws in manufacturer quality control process - Engine turbine components		V				<u>L</u>
188		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components		V			٧	
189		Flaws in aircraft system maintenance process definition - APU systems and / or components		V			V	
190		Lack of adherence to SOP in terms of aircraft icing (condition) monitoring		٧			٧	1



	Safety Performance			Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
191		Lack of adherence to AFM in terms of emergency procedures - engine restart procedure		٧				
192		Flaws in manufacturer quality control process - APU systems and / or components		٧				
193		Lack of adherence to SOP in terms of awareness on supporting systems warning		٧				
194		Unintuitive and / or error prone system manual - ECAM		V				
195		Flaws in manufacturer quality control process - Engine sensors		٧				
196		Flaws in aircraft system maintenance process definition - Engine sensors		V				
197		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine sensors		٧				
198		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components					V	
199		Flaws in manufacturer quality control process - Power supply system components					٧	
200		Excessive pitch attitude		٧				
201		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Anti-icing system components		V				
202		Flaws in manufacturer quality control process - Anti-icing system components		V				
203		Flaws in aircraft system maintenance process definition - Anti-icing systems components		V				
204		Incorrect use of automation - Anti-icing system		V				
205		Unintuitive and / or error prone system manual - Anti-icing system		V				
206		Lack of adherence to AFM in terms of emergency procedures - stall recovery		٧			٧	
207		Unintuitive and / or error prone system manual - CPCS					V	
208		Lack of or poor communication quality					V	
209		Flaws in aircraft system maintenance process definition - Electrical wiring System		V			٧	
210		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.					V	
211		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.					V	
212		Flaws in manufacturer quality control process - Communication equipment systems and components.					٧	
213		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)					V	
214		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)					٧	
215		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine					V	



	Safety Performance			Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
216		Navigation deviation					٧	
217		Flaws in manufacturer quality control process - Autothrottle system in the engine.					٧	
218		Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.					٧	
219		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components					V	
220		Flaws in aircraft system maintenance process definition - Hydraulic System					٧	
221		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)					٧	
222		Flaws in aircraft system maintenance process definition - Fire detection system components					٧	
223		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components					V	
224		Flaws in manufacturer quality control process - Fire detection system components					٧	<u> </u>
225		Flaws in aircraft system maintenance process definition - Fire warning system					٧	
226		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system					V	
227		Flaws in manufacturer quality control process - Fire warning system					٧	
228		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components					V	
229		Flaws in aircraft system maintenance process definition - Fire extinguishing system components					٧	
230		Flaws in manufacturer quality control process - Fire extinguishing system components					V	
231		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components					٧	
232		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.					V	
233		Flaws in manufacturer quality control process - Onboard navigational systems and components.					V	
234		Incorrect use of automation - TOCW System					٧	
235		Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.					٧	
236		Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.					٧	
237		Flaws in aircraft system maintenance process definition - TOCW System					٧	
238		Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing					٧	
239		Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.					V	
240		Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT)					٧	



	Safety Performance			Ор	eration	al issu	<u></u> е	
No.	Indicators	Precursors	1	2	3	4	5	6
241		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - antiice fluid HOT					V	
242		Unintuitive and / or error prone system manual - FMC					٧	
243		Unintuitive and / or error prone system manual - TOCW					V	
244		Applied de-icing / anti-icing method is not sufficient for predicted conditions					V	
245		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System					V	
246		Incorrect stab-trim setting					V	
247		Undetected incorrect takeoff configuration					٧	
248		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FCS system or components		V				
249		Flaws in manufacturer quality control process - FCS system components		٧				
250		Flaws in aircraft system maintenance process definition - FCS systems or components		٧				
251		Flaws in aircraft system maintenance process definition - stickshaker					V	
252		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - stickshaker system components					٧	
253		Lack of adherence to SOP in terms of awareness on supporting systems warning - stickshaker					٧	
254		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					V	
255		Poor application of T/O & RTO procedure, failure recognition and preparedness					٧	
256		Error in calculation of necessary amount of fuel		٧				
257		Lack of adherence to the current technology standards in terms of flight safety and efficiency - engines location.		٧				
258		Lack of adherence to AFM in terms of emergency procedures - engine failure		٧				
259		Inadequate stall recovery procedure for the aircraft					٧	
260		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment					٧	
261		Poor application of T/O & RTO procedure, braking initiation sequence					V	
262		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum					٧	
263		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.					V	
264		Poor application of T/O & RTO procedure, computation of T/O parameters					٧	
265		Flaws in aircraft system maintenance process definition - Engine systems and / or components		٧				



	Safety Performance	<u>_</u>		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
266		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Electrical / wiring system components		V			,	
267		Flaws in manufacturer quality control process - Electrical / wiring systems components		V				
131	Rate of landing gear system failures/flight	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	V	V			V	V
132		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	V	V			٧	V
133		Pilot tiredness - Inadequate workload distribution	V	V			٧	V
134		Flaws in pilot requirements definition process and/or training methodology	٧	V			٧	٧
135		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		V			V	V
136		Unintuitive and / or error prone system manual - CPCS					٧	V
137		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.		V			٧	٧
138		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	V	V			٧	٧
139		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components		V			V	
140		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fuel system components		V				
141		Flaws in aircraft system maintenance process definition - Fuel system compoonents		V				
142		Flaws in manufacturer quality control process - Engine systems and / or components		V			٧	
143		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		V			٧	V
144		Aggressive maneuvering / overcontrolling		v				V
145		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring		V			٧	V
146		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components		V			V	
147		Flaws in aircraft system maintenance process definition - Hydraulic System		V			V	
148		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components		V			V	
149		Flaws in aircraft system maintenance process definition - APU systems and / or components		V			٧	
150		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake)	V				V	
151		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components		V			V	



	Safety Performance			Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
152		Flaws in aircraft system maintenance process definition - Fire detection system components		٧			٧	
153		Flaws in manufacturer quality control process - Fire detection system components		٧			>	
154		Flaws in aircraft system maintenance process definition - Fire warning system		V			٧	
155		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system		V			V	
156		Flaws in manufacturer quality control process - Fire warning system		V			V	
157		High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,)		V				V
158		Late deceleration and configuration set-up for approach and landing		V				٧
159		Inadequate maintenance of fire vulnerable aircraft parts or components		V				
160		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements in terms of fire resistance		V				
161		Unstabilized final approach (high, fast, steep,)		V			l	V
162		Lack of adherence to emergency procedures - control recovery		٧				٧
163		Flaws in aircraft system maintenance process definition - Engine systems and / or components		٧			٧	
164		Flaws in manufacturer quality control process - APU systems and / or components		٧				
165		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					٧	
166		Lack of adherence to SOP in terms of fuelling procedure		V				
167		Lack of adherence to SOP in terms of approach and landing		٧				V
168		Flaws in aircraft system maintenance process definition - Electrical wiring System		V				
169		Lack of adherence to regulations concerning transport of DGR goods		٧				
170		Separation of structural element / component of the aircraft during take-off or landing		٧				
171		Lack of adherence to engine limitations		V				
172		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Electrical / wiring system components		V				
173		Flaws in manufacturer quality control process - Electrical / wiring systems components		٧				
174		Inadequate aircraft de-icing / anti-icing		٧			٧	
175		Poor application of T/O & RTO procedure, failure recognition and preparedness					٧	
176		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of fire detection / warning or / and extinguishing system.		V				



	Safety Performance			Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
177		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.		V			V	
178		Flaws in aircraft system maintenance process definition - Components of Wing control surface system.		٧			٧	
179		Flaws in manufacturer quality control process - Components of Wing control surface system.		٧			٧	
180		Flaws in aircraft system maintenance process definition - Landing gear components.		٧				
181		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components		V			V	
182		Flaws in manufacturer quality control process - Landing gear components.	<u> </u>	V				
183		DME / ILS DME confusion in assessing the final descent point / FAF		٧				٧
184		Flaws in aircraft system maintenance process definition - Fire extinguishing system components	<u> </u>	٧			٧	
185		Flaws in manufacturer quality control process - Fire extinguishing system components		٧			٧	
186		Lack of or poor communication quality	٧				٧	
187		Flaws in CRM training procedures		٧			٧	٧
188		Lack of adherence to the main CRM rules		٧			٧	V
189		Traffic controller tiredness - Inadequate workload distribution	٧				٧	٧
190		Flaws in traffic controller requirements definition process and/or training methodology	٧				٧	V
191		Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing		٧				V
192		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path		V				V
193		Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather.		V				V
194		Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure		٧				٧
195		Incorrect use of automation - FMS	<u> </u>	٧				V
196		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.		V				V
197		Poor application of T/O & RTO procedure, aircraft handling	<u> </u>				٧	
198		Unintuitive and / or error prone system manual - FMS		٧				٧
199		Lack of adherence to AFM limitations for landing		٧				٧
200		Descent above desired descent profile		٧				٧
201		Inadequate de-icing method applied		٧			_ 	



	Safety Performance	<u>_</u>		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
202		Incorrect use of automation -Engine anti-ice system		٧				
203		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Compressor in the engine		V				
204		Flaws in manufacturer quality control process - Compressor in the engine.		٧				
205		Flaws in aircraft system maintenance process definition - Compressor in the engine.		٧				
206		Flaws in manufacturer quality control process - Engine accessory drive components.		٧				
207		Flaws in aircraft system maintenance process definition - Engine accessory drive components.		٧				
208		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine accessory drive components.		V				
209		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ECAM (or similar) system components.		V				
210		Flaws in aircraft system maintenance process definition - ECAM (or similar) system components.		٧				
211		Unintuitive and / or error prone system manual - Engine anti-icing system		٧				
212		Lack of adherence to the SOP in terms of critical indicators cross-checking		٧				
213		Lack of adherence to SOP in terms of AFM limitations		V				
214		Lack of adherence to SOP in terms of de-icing / anti-icing procedures.		٧				
215		Lack of adherence to SARPs in terms of avoiding adverse weather conditions during flight		٧				
216		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ECAM.		V				
217		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Integrity of primary aircraft structure.		V				
218		Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.		٧				
219		Flaws in manufacturer quality control process - Integrity of primary aircraft structure.		٧				
220		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Reduction gear in the engine		V				
221		Flaws in manufacturer quality control process - Reduction gear in the engine.		V				
222		Flaws in aircraft system maintenance process definition - Reduction gear in the engine.		٧				
223		Flaws in manufacturer quality control process - ECAM (or similar) system components.		٧				
224		Lack of adherence to emergency procedures - Fuel starvation		٧				
225		Flaws in manufacturer quality control process - Fuel system components.		٧				
226		Tailwind component above limit						٧



	Safety Performance			Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
227		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine anti-ice systems and / or components		V				
228		Flaws in manufacturer quality control process - Engine anti-ice system and / or components		V			<u> </u>	
229		Flaws in aircraft system maintenance process definition - Engine anti-ice system and / or components		V				
230		Flaws in aircraft system maintenance process definition - Oil distribution system		V			<u> </u>	
231		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Oil distribution system		V				
232		Flaws in manufacturer quality control process - Oil distribution system		V			l	
233		Lack of adherence to AFM in terms of emergency procedures - fire detection and extinguishing procedure		٧				
234		Lack of English proficiency	V				V	
235		Incorrect or confusing / misleading ATC instructions	V				V	
236		Use of non-standard phraseology by pilot and/or controller	V				V	
237		Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications	v				V	
238		Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.	V				V	
239		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence	V				V	
240		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity	V				٧	
241		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	٧				V	
242		Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.					V	
243		Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.					V	
244		Inadequate effectivenes of fire extinguishing system		V			1	
245		Incorrect stab-trim setting					V	
246		Unintuitive and / or error prone system manual - fire extinguishing system		V				
247		Inadvertent deviation from cleared taxi route	V					
248		Lack of adherence to SOP for GND movements. Poor execution of parking / docking /pushback procedure	V					
249		Lack of adherence to SOP for GND movements.	V					
250		Current airport diagram not reflecting critical changes	V				-	
251		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment	V					



	Safety Performance			Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
252		Slow rotation (i.e., low pitch rate)					٧	
253		Lack of adherence to SOP for take-off procedure in terms of speed bug checklist preparation and verification.					V	
254		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FCS system or components					V	
255		Flaws in manufacturer quality control process - FCS system components					V	
256		Flaws in aircraft system maintenance process definition - FCS systems or components					٧	
257		Flaws in aircraft system maintenance process definition - Engine combustor		V				
258		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine combustor		V				
259		Flaws in manufacturer quality control process - Engine combustor		V				
260		Flaws in aircraft system maintenance process definition - Engine turbine components		V				
261		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine turbine components		V				
262		Flaws in manufacturer quality control process - Engine turbine components		V				
263		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components					٧	
264		Flaws in manufacturer quality control process - Power supply system components					V	
265		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.					V	
266		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.					V	
267		Flaws in manufacturer quality control process - Communication equipment systems and components.					V	
268		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)					V	
269		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)					V	
270		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine					V	
271		Navigation deviation					V	
272		Flaws in manufacturer quality control process - Autothrottle system in the engine.					٧	
273		Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.					٧	
274		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)					٧	
275		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components					V	



	Safety Performance	_		Ор	eration	al issu	е	
No.	Indicators	Precursors	1	2	3	4	5	6
276		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.					V	
277		Flaws in manufacturer quality control process - Onboard navigational systems and components.					٧	
278		Lack of adherence to emergency procedures - RWY collision avoidance	V					
279		Lack of adherence to emergency procedures - WEM						V
280		Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared						V
281		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System.						V
282		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).						V
283		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system						V
284		Flaws in manufacturer quality control process - PWS system components						V
285		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.						V
286		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - LLWAS system						V
287		Long / floating flare						V
288		Poor application of T/O & RTO procedure, braking initiation sequence					٧	
289		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum					V	
290		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment					٧	
291		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.					٧	
292		Poor application of T/O & RTO procedure, computation of T/O parameters					٧	
293		Late rejected takeoff decision / initiation					٧	
294		Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations					٧	
295		Failure to remember / assess crosswind component limit for prevailing runway condition					٧	V
296		Lack of adherence to the current technology standards in terms of flight safety and efficiency - engines location.		٧				
297		Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots					٧	
298		Takeoff without clearance					٧	
299		Landing without clearance					٧	
300		Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings					V	



	Safety Performance			Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
301		Late activation of pedal braking or takeover from autobrake, when so required						٧
302		Delayed selection of reverse thrust						V
303		Inappropriate selection of autobrake mode for given runway length and condition						٧
304		Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling					٧	
305		Lack of adherence to AFM limitations for Take-off					٧	
306		Unintuitive and / or error prone system manual - FMC					٧	
307		Undetected incorrect takeoff configuration					٧	
308		Lack of adherence to Rules of the Air - adherence to Controller clearance					٧	
309		Flaws in Airspace and Air Traffic planning procedures design process					٧	
310		Taxiing without clearance		V				
311		Flaws in airport capacity management process					٧	
312		Lack of adherence to SOP for take-off procedure in terms of time limitation for take-off preparation.					٧	
313		Inadequate crosswind landing / decrab technique						V
314		Touchdown off centerline						V
315		Lack of adherence to AFM in terms of emergency procedures - engine restart procedure		٧				
316		Inappropriate use of differential reverse thrust						V
317		Inadequate use of differential braking						V
318		Use of nose wheel steering tiller during rollout						V
319		Flaws in manufacturer quality control process - Engine sensors		V				
320		Flaws in aircraft system maintenance process definition - Engine sensors		٧				
321		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine sensors		V				
131	Rate of navigation system failures/flight	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology					V	
132		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution					٧	
133		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components					V	
134		Flaws in manufacturer quality control process - Power supply system components					٧	
135		Navigation deviation					٧	



	Safety Performance			Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
136		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components					٧	
137		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.					٧	
138		Flaws in manufacturer quality control process - Onboard navigational systems and components.					٧	
139		Unintuitive and / or error prone system manual - CPCS					V	
140		Lack of or poor communication quality					V	
141		Inadequate aircraft de-icing / anti-icing					٧	
142		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.					V	
143		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.					V	
144		Flaws in manufacturer quality control process - Communication equipment systems and components.					V	
145		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.					V	
146		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)					V	
147		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)					V	
148		Flaws in aircraft system maintenance process definition - Components of Wing control surface system.					V	
149		Flaws in manufacturer quality control process - Components of Wing control surface system.					٧	
150		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine					V	
151		Flaws in manufacturer quality control process - Autothrottle system in the engine.					V	
152		Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.					٧	
153		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components					V	
154		Flaws in aircraft system maintenance process definition - Hydraulic System					V	
155		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components					V	
156		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)					V	
157		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components					٧	
158		Flaws in aircraft system maintenance process definition - APU systems and / or components					٧	
159		Flaws in aircraft system maintenance process definition - Fire detection system components					٧	



	Safety Performance			Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
160		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components					V	
161		Flaws in manufacturer quality control process - Fire detection system components					V	
162		Flaws in aircraft system maintenance process definition - Fire warning system					V	
163		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system					٧	
164		Flaws in manufacturer quality control process - Fire warning system					V	
165		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components					V	
166		Flaws in aircraft system maintenance process definition - Fire extinguishing system components					V	
167		Flaws in manufacturer quality control process - Fire extinguishing system components					V	
168		Pilot tiredness - Inadequate workload distribution					٧	
169		Flaws in pilot requirements definition process and/or training methodology					V	
170		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					V	
171		Poor application of T/O & RTO procedure, failure recognition and preparedness					٧	
172		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment					٧	
173		Poor application of T/O & RTO procedure, braking initiation sequence					V	
174		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum					V	
175		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.					V	
176		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.					V	
177		Poor application of T/O & RTO procedure, computation of T/O parameters					V	
131	Rate of powerplant system failures/flight	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	V	v			V	V
132		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	V	V			V	V
133		Pilot tiredness - Inadequate workload distribution	V	V			V	٧
134		Flaws in pilot requirements definition process and/or training methodology	V	v			٧	٧
135		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.		V			٧	
136		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	V	V			V	V
137		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance		ν			٧	



	Safety Performance			Ор	eration	al issu	<u> </u>	
No.	Indicators	Precursors	1	2	3	4	5	6
		with requirements - Engine systems and / or components						
138		Flaws in manufacturer quality control process - Engine systems and / or components		٧			٧	
139		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		V			V	
140		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring		V			٧	
141		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fuel system components		V				
142		Flaws in aircraft system maintenance process definition - Fuel system compoonents		V				
143		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		V			٧	
144		Inadequate aircraft de-icing / anti-icing		٧			V	
145		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.		V			V	
146		Flaws in aircraft system maintenance process definition - Components of Wing control surface system.		V			V	
147		Flaws in manufacturer quality control process - Components of Wing control surface system.		٧			٧	
148		Aggressive maneuvering / overcontrolling		V				٧
149		Lack of adherence to SOP in terms of AFM limitations		٧				
150		Lack of adherence to the SOP in terms of critical indicators cross-checking		٧				
151		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Integrity of primary aircraft structure.		V				
152		Flaws in manufacturer quality control process - Integrity of primary aircraft structure.		٧				
153		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components		V			V	
154		Flaws in aircraft system maintenance process definition - APU systems and / or components		٧			V	
155		Lack of adherence to SARPs in terms of avoiding adverse weather conditions during flight		٧				
156		Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.		٧				
157		Flaws in aircraft system maintenance process definition - Engine systems and / or components		٧			٧	
158		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine anti-ice systems and / or components		V				
159		Flaws in manufacturer quality control process - Engine anti-ice system and / or components		٧				
160		Flaws in aircraft system maintenance process definition - Engine anti-ice system and / or components		٧				
161		Incorrect use of automation -Engine anti-ice system		٧			_ 	



	Safety Performance	_		Op	eration	al issue	e	
No.	Indicators	Precursors	1	2	3	4	5	6
162		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Reduction gear in the engine		V				
163		Flaws in manufacturer quality control process - Reduction gear in the engine.		٧				ļ
164		Flaws in aircraft system maintenance process definition - Reduction gear in the engine.		٧				ļ
165		Flaws in manufacturer quality control process - Fuel system components.		V				ļ
166		Inadequate de-icing method applied		٧				
167		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Compressor in the engine		V				
168		Flaws in manufacturer quality control process - Compressor in the engine.		V				ļ
169		Flaws in aircraft system maintenance process definition - Compressor in the engine.		٧				
170		Flaws in manufacturer quality control process - Engine accessory drive components.		٧				
171		Flaws in aircraft system maintenance process definition - Engine accessory drive components.		٧				
172		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine accessory drive components.		V				
173		Flaws in aircraft system maintenance process definition - Oil distribution system		٧				
174		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Oil distribution system		V				
175		Flaws in manufacturer quality control process - Oil distribution system		٧				
176		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ECAM (or similar) system components.		V				
177		Flaws in aircraft system maintenance process definition - ECAM (or similar) system components.		V				
178		Unintuitive and / or error prone system manual - Engine anti-icing system		٧				
179		Lack of adherence to SOP in terms of de-icing / anti-icing procedures.		٧				
180		Flaws in manufacturer quality control process - ECAM (or similar) system components.		٧				
181		Lack of adherence to emergency procedures - Fuel starvation		٧				
182		Flaws in manufacturer quality control process - Landing gear components.		٧				
183		Flaws in aircraft system maintenance process definition - Landing gear components.		٧				
184		Flaws in manufacturer quality control process - APU systems and / or components		٧				
185		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ECAM.		٧				
186		Flaws in aircraft system maintenance process definition - Engine combustor		٧				



	Safety Performance	_		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
187		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine combustor		V				
188		Flaws in manufacturer quality control process - Engine combustor		٧			<u> </u>	
189		Flaws in aircraft system maintenance process definition - Engine turbine components		٧			<u> </u>	
190		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine turbine components		V				
191		Flaws in manufacturer quality control process - Engine turbine components		V			l	
192		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components		V			V	
193		Flaws in aircraft system maintenance process definition - Hydraulic System		V			V	
194		Unintuitive and / or error prone system manual - CPCS					V	
195		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components		V			V	
196		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					V	
197		Flaws in aircraft system maintenance process definition - Fire detection system components		٧			V	
198		Flaws in manufacturer quality control process - Fire detection system components		٧			V	
199		Flaws in aircraft system maintenance process definition - Fire warning system		٧			V	
200		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system		٧			V	
201		Flaws in manufacturer quality control process - Fire warning system		٧			V	
202		Lack of adherence to AFM limitations for Take-off		V			V	
203		Flaws in aircraft system maintenance process definition - Electrical wiring System		٧				
204		Lack of adherence to regulations concerning transport of DGR goods		٧				
205		Lack of adherence to engine limitations		٧				
206		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Electrical / wiring system components		٧				
207		Flaws in manufacturer quality control process - Electrical / wiring systems components		V				
208		Lack of adherence to SOP in terms of fuelling procedure		٧				
209		Inadequate maintenance of fire vulnerable aircraft parts or components		٧				
210		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements in terms of fire resistance		V				



	Safety Performance	_		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
211		Separation of structural element / component of the aircraft during take-off or landing		٧				
212		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of fire detection / warning or / and extinguishing system.		V				
213		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components		V			V	
214		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum					V	
215		Poor application of T/O & RTO procedure, aircraft handling					V	
216		Flaws in aircraft system maintenance process definition - Fire extinguishing system components		V			V	
217		Flaws in manufacturer quality control process - Fire extinguishing system components		V			V	
218		Lack of or poor communication quality	V				V	
219		Failure to remember / assess crosswind component limit for prevailing runway condition					V	V
220		Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling					V	
221		Poor application of T/O & RTO procedure, failure recognition and preparedness					V	
222		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine		V			٧	
223		Flaws in manufacturer quality control process - Autothrottle system in the engine.		V			V	
224		Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.		V			V	
225		Lack of adherence to AFM in terms of emergency procedures - engine restart procedure		V			1	
226		Lack of adherence to SOP in terms of awareness on supporting systems warning		V				
227		Unintuitive and / or error prone system manual - ECAM		V				
228		Flaws in manufacturer quality control process - Engine sensors		V				
229		Flaws in aircraft system maintenance process definition - Engine sensors		V				
230		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine sensors		V				
231		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)		V			V	
232		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)		٧			٧	
233		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)		٧			٧	
234		Lack of adherence to AFM in terms of emergency procedures - fire detection and extinguishing procedure		٧				
235		Traffic controller tiredness - Inadequate workload distribution	V				V	V



	Safety Performance	<u>_</u>		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
236		Flaws in traffic controller requirements definition process and/or training methodology	V				٧	٧
237		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake)	v				V	
238		Late rejected takeoff decision / initiation					٧	
239		Lack of English proficiency	V				٧	
240		Incorrect or confusing / misleading ATC instructions	V				V	
241		Use of non-standard phraseology by pilot and/or controller	V				V	
242		Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications	V				V	
243		Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.	V				V	
244		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence	V				V	
245		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity	V				٧	
246		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	V				V	
247		Inadequate effectivenes of fire extinguishing system		V				
248		Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations					٧	
249		Unintuitive and / or error prone system manual - fire extinguishing system		V				
250		Inadvertent deviation from cleared taxi route	V					
251		Lack of adherence to SOP for GND movements. Poor execution of parking / docking /pushback procedure	V				1	
252		Lack of adherence to SOP for GND movements.	V				1	
253		Current airport diagram not reflecting critical changes	V				1	
254		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment	V					
255		Flight below maneuvering speeds		V				
256		Lack of adherence to AFM in terms of emergency procedures - stall recovery		V			V	
257		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine fuel distribution system		v				
258		Flaws in manufacturer quality control process - Engine fuel distribution system		٧				
259		Flaws in aircraft system maintenance process definition - Engine fuel distribution system		٧				
260		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components					٧	



	Safety Performance			Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
261		Flaws in manufacturer quality control process - Power supply system components					٧	
262		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.					V	
263		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.					V	
264		Flaws in manufacturer quality control process - Communication equipment systems and components.					V	
265		Navigation deviation					V	
266		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Thrust reverse system in the engine.		V				
267		Flaws in manufacturer quality control process - Thrust reverse system in the engine.		V				
268		Flaws in aircraft system maintenance process definition - Thrust reverse system in the engine.		V			1	
269		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components					V	
270		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.					V	
271		Flaws in manufacturer quality control process - Onboard navigational systems and components.					V	
272		Lack of adherence to emergency procedures - RWY collision avoidance	٧					
273		Lack of adherence to SOP in terms of load sheet preparation and verification		V			1	
274		Lack of adherence to the current technology standards in terms of flight safety and efficiency - fuel tank allocation.		٧				
275		Lack of adherence to SOP in terms of AFM limitations in terms of weigh and balance		V				
276		Lack of adherence to SOP in terms of pre-flight inspections - cargo securing quality		٧				
277		Poor application of T/O & RTO procedure, braking initiation sequence					V	
278		Flaws in CRM training procedures		V			V	V
279		Lack of adherence to the main CRM rules		V			V	V
280		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Rudder components.		V				
281		Flaws in aircraft system maintenance process definition - Rudder components.		٧				
282		Flaws in manufacturer quality control process - Rudder components.		٧				
283		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Horizontal stabilizer components.		V				
284		Flaws in aircraft system maintenance process definition - Horizontal stabilizer components.		٧				
285		Flaws in manufacturer quality control process - Horizontal stabilizer components.		٧				



	Safety Performance			Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
286		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment					٧	
287		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.					٧	
288		Error in calculation of necessary amount of fuel		٧				
289		Lack of adherence to SOP in terms of approach and landing		٧				V
290		Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing		V				V
291		Poor application of T/O & RTO procedure, computation of T/O parameters					٧	
292		Lack of adherence to the current technology standards in terms of flight safety and efficiency - engines location.		V				
293		Lack of adherence to emergency procedures - control recovery		V				V
294		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path		V				V
295		Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport in the case of adverse weather.		V				٧
296		Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure		V				V
297		Incorrect use of automation - FMS		٧				V
298		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.		V				٧
299		Lack of adherence to emergency procedures - recovery from severe FCS failure		٧				
300		High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,)						٧
301		Late deceleration and configuration set-up for approach and landing						V
302		Lack of adherence to AFM in terms of emergency procedures - engine failure		٧				
303		Unintuitive and / or error prone system manual - FMS		٧				V
304		Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots					٧	
305		Takeoff without clearance					٧	
306		Landing without clearance					٧	
307		Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings					٧	
308		Lack of adherence to emergency procedures - WEM						٧
309		Late activation of pedal braking or takeover from autobrake, when so required						٧
310		Delayed selection of reverse thrust						٧
311		Inappropriate selection of autobrake mode for given runway length and condition						٧



	Safety Performance			Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
312		Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.					٧	
313		Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.					V	
314		Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared						V
315		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System.						V
316		Unintuitive and / or error prone system manual - FMC					V	
317		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).						V
318		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system						V
319		Incorrect stab-trim setting					٧	
320		Undetected incorrect takeoff configuration					٧	
321		Lack of adherence to Rules of the Air - adherence to Controller clearance					٧	
322		Flaws in manufacturer quality control process - PWS system components						V
323		Flaws in Airspace and Air Traffic planning procedures design process					٧	
324		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.						V
325		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - LLWAS system						V
326		Flaws in airport capacity management process					٧	
327		Lack of adherence to SOP for take-off procedure in terms of time limitation for take-off preparation.					٧	
328		Descent above desired descent profile						V
329		DME / ILS DME confusion in assessing the final descent point / FAF						V
330		Unstabilized final approach (high, fast, steep,)						V
331		Tailwind component above limit						V
332		Inadequate crosswind landing / decrab technique						V
333		Touchdown off centerline						V
334		Inappropriate use of differential reverse thrust						V
335		Inadequate use of differential braking						V
336		Use of nose wheel steering tiller during rollout						V



	Safety Performance	Precursors		Ор	eration	al issu	е	
No.	Indicators	FIECUISOIS	1	2	3	4	5	6
	HUMAN	Deviations: procedural or flight path	GCOL	LOC-I	CFIT	MAC	RE-TO	RE-L
131	Rate of runway incursions/flight	Pilot tiredness - Inadequate workload distribution	V	٧			V	
132		Flaws in pilot requirements definition process and/or training methodology	V	V			V	
133		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	V	V			٧	
134		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	V	V			٧	
135		Traffic controller tiredness - Inadequate workload distribution	V	V			V	
136		Flaws in traffic controller requirements definition process and/or training methodology	V	V			V	
137		Lack of or poor communication quality	V				V	
138		Lack of English proficiency	V	V			V	
139		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	٧	٧			V	
140		Incorrect or confusing / misleading ATC instructions	٧	V			٧	
141		Use of non-standard phraseology by pilot and/or controller	V	V			V	
142		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components		V			V	
143		Flaws in aircraft system maintenance process definition - Hydraulic System		V			٧	
144		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components		٧			V	
145		Flaws in aircraft system maintenance process definition - APU systems and / or components		V			٧	
146		Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.	V				V	
147		Takeoff without clearance	V				V	
148		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components		V			V	
149		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity	V				V	
150		Landing without clearance	V				V	



	Safety Performance	Duraninana	T	Ор	eration	al issu	е	
No.	Indicators	Precursors	1	2	3	4	5	6
151		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.		V			٧	
152		Flaws in aircraft system maintenance process definition - Fire detection system components		V			V	
153		Flaws in manufacturer quality control process - Fire detection system components		٧			٧	
154		Flaws in aircraft system maintenance process definition - Fire warning system		٧			V	
155		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system		V			٧	
156		Flaws in manufacturer quality control process - Fire warning system		V			V	
157		Lack of adherence to SOP for GND movements.	V	V				
158		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence	V				V	
159		Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	٧				٧	
160		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	٧				V	
161		Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	٧				V	
162		Separation of structural element / component of the aircraft during take-off or landing		V				
163		Lack of adherence to SOP in terms of fuelling procedure		V				
164		Flaws in aircraft system maintenance process definition - Electrical wiring System		V				
165		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fuel system components		٧				
166		Inadequate maintenance of fire vulnerable aircraft parts or components		V				
167		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements in terms of fire resistance		V				
168		Lack of adherence to regulations concerning transport of DGR goods		V				
169		Flaws in aircraft system maintenance process definition - Fuel system compoonents		V				
170		Lack of adherence to engine limitations		٧				
171		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components		V				
172		Flaws in manufacturer quality control process - Engine systems and / or components		V				
173		Flaws in aircraft system maintenance process definition - Engine systems and / or components		٧				
174		Flaws in manufacturer quality control process - APU systems and / or components		٧				
175		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Electrical / wiring system components		V				
176		Flaws in manufacturer quality control process - Electrical / wiring systems components		V			İ	



	Safety Performance	Discourage		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
177		Inadvertent deviation from cleared taxi route	V					
178		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of fire detection / warning or / and extinguishing system.		V				
179		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components		V			V	
180		Current airport diagram not reflecting critical changes	V					<u> </u>
181		Flaws in aircraft system maintenance process definition - Fire extinguishing system components		V			V	l
182		Flaws in manufacturer quality control process - Fire extinguishing system components		V			٧	
183		Unintuitive and / or error prone system manual - CPCS		V			V	
184		Callsign confusion	٧					
185		Lack of adherence to SOP in terms of ATCO and approach or ground controller communication	V					
186		Unintuitive and / or error prone system manual - ground radar.	V					
187		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground Radar	V					
188		Hearback ommitted	V					
189		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ground radar at the airport.	V					
190		Lack of adherence to SOP in terms of awareness on supporting systems (warning) - ground radar.	V					
191		Lack of adherence to Rules of the Air - adherence to Controller clearance					٧	
192		Lack of adherence to AFM in terms of emergency procedures - fire detection and extinguishing procedure		V				
193		Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications	V				٧	
194		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		V			V	
195		Inadequate effectivenes of fire extinguishing system		V				
196		Unintuitive and / or error prone system manual - fire extinguishing system		V				
197		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					٧	
198		Flaws in CRM training procedures					٧	
199		Lack of adherence to the main CRM rules					٧	
200		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.					٧	
201		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.					V	



	Safety Performance	Discoursers	V V V V V V V V V V V V V V V V V V V					
No.	Indicators	Precursors	1	2	3	4	5	6
202		Flaws in manufacturer quality control process - Communication equipment systems and components.					٧	
203		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring					٧	
204		Lack of adherence to SOP for take-off procedure in terms of time limitation for take-off preparation.					٧	
205		Inadequate aircraft de-icing / anti-icing					٧	
206		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components					V	
207		Flaws in manufacturer quality control process - Power supply system components					٧	
208		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.					V	
209		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)					V	
210		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)					٧	1
211		Flaws in aircraft system maintenance process definition - Components of Wing control surface system.					٧	
212		Flaws in manufacturer quality control process - Components of Wing control surface system.					V	
213		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine					٧	
214		Navigation deviation					٧	
215		Flaws in Airspace and Air Traffic planning procedures design process					٧	
216		Flaws in manufacturer quality control process - Autothrottle system in the engine.					V	
217		Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.					٧	
218		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components					V	
219		Flaws in airport capacity management process					V	
220		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)					V	
221		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components					٧	
222		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.					٧	
223		Flaws in manufacturer quality control process - Onboard navigational systems and components.					V	
224		Lack of adherence to SOP in terms of awareness on supporting systems (warning) - RIMCAS.	V					
225		Late rejected takeoff decision / initiation					V	
226		Lack of adherence to emergency procedures - RWY collision avoidance	V					



	Safety Performance	Discourse		Ор	eration	al issu	<u></u>	
No.	Indicators	Precursors	1	2	3	4	5	6
227		Lack of adherence to ICAO Annex 14 and related documents in terms of airside lights distribution	V					
228		Lack of adherence to ICAO Annex 14 and related documents in terms of nonrestricted view on airsite from TWR	V					
229		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of Runway Conflict Warning System.	V					
230		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - RCWS	V					
231		Poor application of T/O & RTO procedure, failure recognition and preparedness					V	
232		Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations					V	
233		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Integrity of primary aircraft structure.		٧				
234		Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.		٧				
235		Flaws in manufacturer quality control process - Integrity of primary aircraft structure.		V				
236		Lack of adherence to emergency procedures - flight deck smoke procedure		V				
237		Lack of adherence to the SOP in terms of critical maneuvre execution - flare		V				
238		Extreme operation condition / poor maintenance quality / advanced life lenght		V				
239		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components		٧				
240		Flaws in aircraft system maintenance process definition - Aircraft door system and / or components		V				
241		Flaws in manufacturer quality control process - CPCS system and / or components		V				
242		Flaws in aircraft system maintenance process definition - CPCS system and / or components		V				
243		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - CPCS system and / or components		٧				
244		Incorrect use of automation - CPCS		V				
245		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment					V	
246		Poor application of T/O & RTO procedure, braking initiation sequence					٧	
247		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum					٧	
248		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.					V	
249		Poor application of T/O & RTO procedure, computation of T/O parameters					V	
250		Inadequate management / separation of takeoffs and landings	V					
131	Rate of taxiway incursions/flight	Pilot tiredness - Inadequate workload distribution	V	٧				



	Safety Performance	Decompose		Ор	eration	e		
No.	Indicators	Precursors	1	2	3	4	5	6
132		Flaws in pilot requirements definition process and/or training methodology	V	V				
133		Traffic controller tiredness - Inadequate workload distribution	V	V				1
134		Flaws in traffic controller requirements definition process and/or training methodology	V	V				1
135		Lack of adherence to SOP for GND movements.	V	V				1
136		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	٧	٧				
137		Incorrect or confusing / misleading ATC instructions	V	V				
138		Use of non-standard phraseology by pilot and/or controller	V	V				
139		Lack of English proficiency	V	V				
140		Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.	V					
141		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence	V					
142		Inadvertent deviation from cleared taxi route	V					
143		Lack of or poor communication quality	V					
144		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity	٧					
145		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	V					1
146		Current airport diagram not reflecting critical changes	V					
147		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	V	V				1
148		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	V	V				
149		Lack of adherence to SOP in terms of ATCO and approach or ground controller communication	V					
150		Unintuitive and / or error prone system manual - ground radar.	V					
151		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground Radar	٧					
152		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ground radar at the airport.	V					
153		Lack of adherence to SOP in terms of awareness on supporting systems (warning) - ground radar.	V					
154		Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	V					
155		Callsign confusion	V					
156		Takeoff without clearance	V					
157		Landing without clearance	V					



	Safety Performance	Discourse	Τ	Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
158		Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	V					
159		Hearback ommitted	V					
160		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment	V					
161		Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications	V					
162		Lack of adherence to SOP for GND movements. Poor execution of parking / docking /pushback procedure	٧					
163		Lack of adherence to emergency procedures - RWY collision avoidance	V					
164		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake)	V					
165		Lack of adherence to SOP in terms of awareness on supporting systems (warning) - RIMCAS.	٧					
166		Lack of adherence to ICAO Annex 14 and related documents in terms of airside lights distribution	٧					
167		Lack of adherence to ICAO Annex 14 and related documents in terms of nonrestricted view on airsite from TWR	V					
168		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of Runway Conflict Warning System.	V					
169		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - RCWS	V					
170		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		V				
171		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Integrity of primary aircraft structure.		V				
172		Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.		V				
173		Flaws in manufacturer quality control process - Integrity of primary aircraft structure.		V				
174		Lack of adherence to emergency procedures - flight deck smoke procedure		V				
175		Lack of adherence to the SOP in terms of critical maneuvre execution - flare		V				
176		Extreme operation condition / poor maintenance quality / advanced life lenght		V				
177		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components		٧				
178		Flaws in aircraft system maintenance process definition - Aircraft door system and / or components		V				
179		Flaws in manufacturer quality control process - CPCS system and / or components		V				
180		Flaws in aircraft system maintenance process definition - CPCS system and / or components		V				
181		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - CPCS system and / or components		V				



	Safety Performance	Precursors		Ор	eration	al issu	e	
No.	Indicators	FIELUISUIS	1	2	3	4	5	6
182		Incorrect use of automation - CPCS		V				1
183		Unintuitive and / or error prone system manual - CPCS		V				
184		Inadequate stall recovery procedure for the aircraft	٧					
131	Rate of stall warnings/flight	Pilot tiredness - Inadequate workload distribution		V			V	V
132		Flaws in pilot requirements definition process and/or training methodology		V			V	V
133		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology		V			V	V
134		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution		V			V	V
135		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties		٧			٧	٧
136		Aggressive maneuvering / overcontrolling		V				V
137		Inadequate aircraft de-icing / anti-icing		V			V	
138		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		٧			٧	٧
139		Lack of adherence to the SOP in terms of critical indicators cross-checking		V				
140		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.		V			V	
141		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring		V			V	
142		Lack of adherence to SOP in terms of de-icing / anti-icing procedures.		V			V	
143		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		V			V	
144		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components		٧			٧	
145		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Integrity of primary aircraft structure.		٧				
146		Flaws in manufacturer quality control process - Integrity of primary aircraft structure.		V				
147		Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.		V				
148		Flaws in manufacturer quality control process - Engine systems and / or components		V			V	
149		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.		٧			V	
150		Flaws in aircraft system maintenance process definition - Components of Wing control surface system.		V			٧	
151		Flaws in manufacturer quality control process - Components of Wing control surface system.		V			٧	
152		Lack of adherence to SARPs in terms of avoiding adverse weather conditions during flight		V				
153		Lack of adherence to SOP in terms of AFM limitations		V				1



	Safety Performance	Descriptions		Ор	eration			
No.	Indicators	Precursors	1	2	3	4	5	6
154		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fuel system components		٧				
155		Flaws in aircraft system maintenance process definition - Fuel system compoonents		V				
156		Flaws in manufacturer quality control process - Fuel system components.		V				
157		Unintuitive and / or error prone system manual - CPCS		V			٧	٧
158		Flaws in manufacturer quality control process - Landing gear components.		V				
159		Flaws in aircraft system maintenance process definition - Landing gear components.		٧				
160		Unintuitive and / or error prone system manual - FMS		V			1	٧
161		Incorrect use of automation - FMS		٧				٧
162		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine anti-ice systems and / or components		٧				
163		Flaws in manufacturer quality control process - Engine anti-ice system and / or components		V				
164		Flaws in aircraft system maintenance process definition - Engine anti-ice system and / or components		V				
165		Incorrect use of automation -Engine anti-ice system		V				
166		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Reduction gear in the engine		٧				
167		Flaws in manufacturer quality control process - Reduction gear in the engine.		V				
168		Flaws in aircraft system maintenance process definition - Reduction gear in the engine.		V				
169		Inadequate de-icing method applied		V				
170		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Compressor in the engine		٧				
171		Flaws in manufacturer quality control process - Compressor in the engine.		V			l	
172		Flaws in aircraft system maintenance process definition - Compressor in the engine.		V			1	
173		Flaws in manufacturer quality control process - Engine accessory drive components.		V				
174		Flaws in aircraft system maintenance process definition - Engine accessory drive components.		V				
175		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine accessory drive components.		V				
176		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ECAM (or similar) system components.		V				
177		Lack of adherence to emergency procedures - Fuel starvation		V				
178		Flaws in aircraft system maintenance process definition - Oil distribution system		V				



	Safety Performance	Discourage		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
179		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Oil distribution system		٧				
180		Flaws in manufacturer quality control process - Oil distribution system		V				
181		Flaws in aircraft system maintenance process definition - ECAM (or similar) system components.		V				
182		Unintuitive and / or error prone system manual - Engine anti-icing system		V				
183		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ECAM.		٧				
184		Flaws in manufacturer quality control process - ECAM (or similar) system components.		V				
185		Lack of adherence to SOP in terms of approach and landing		V				٧
186		Flaws in aircraft system maintenance process definition - Engine combustor		V				
187		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine combustor		٧				
188		Flaws in manufacturer quality control process - Engine combustor		V				
189		Flaws in aircraft system maintenance process definition - Engine turbine components		V				
190		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine turbine components		٧				
191		Flaws in manufacturer quality control process - Engine turbine components		V				
192		Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing		V				٧
193		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path		٧				٧
194		Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport in the case of adverse weather.		٧				٧
195		Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure		V				٧
196		Flaws in CRM training procedures		V				٧
197		Lack of adherence to the main CRM rules		V				٧
198		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.		٧				V
199		Lack of adherence to emergency procedures - control recovery		V				٧
200		Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.					٧	
201		Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.					٧	
202		Unintuitive and / or error prone system manual - FMC					V	
203		Incorrect stab-trim setting					V	



	Safety Performance	Dragiusaus		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
204		Undetected incorrect takeoff configuration					٧	
205		Difference indications of independent aircraft speed / altitude or attitude indicators		V				
206		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Anti-icing system components		V				
207		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components		٧			٧	
208		Flaws in aircraft system maintenance process definition - APU systems and / or components		V			٧	
209		Excessive pitch attitude		V				
210		Excessive bank angle		V				
211		Flaws in manufacturer quality control process - Anti-icing system components		٧				
212		Flaws in aircraft system maintenance process definition - Anti-icing systems components		V				
213		Flaws in aircraft system maintenance process definition - Engine systems and / or components		V			V	
214		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					V	
215		Flaws in manufacturer quality control process - Power supply system components		V			V	
216		Lack of adherence to AFM in terms of emergency procedures - stall recovery		V			V	
217		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components					V	
218		High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,)		٧				V
219		Late deceleration and configuration set-up for approach and landing		V				V
220		Unstabilized final approach (high, fast, steep,)		V				٧
221		Lack of adherence to SOP in terms of aircraft icing (condition) monitoring		V			٧	
222		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)		V			٧	
223		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)		V			٧	
224		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine		V			V	
225		Flaws in manufacturer quality control process - Autothrottle system in the engine.		٧			٧	
226		Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.		V			٧	
227		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)		V			٧	
228		Lack of adherence to AFM in terms of emergency procedures - engine restart procedure		٧				1



	Safety Performance	Ducasinosia		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
229		Flaws in manufacturer quality control process - APU systems and / or components		V				
230		Traffic controller tiredness - Inadequate workload distribution		V				
231		Flaws in traffic controller requirements definition process and/or training methodology		٧				
232		Poor application of T/O & RTO procedure, failure recognition and preparedness					V	
233		Lack of adherence to SOP in terms of awareness on supporting systems warning		٧				
234		Unintuitive and / or error prone system manual - ECAM		٧				
235		Descent above desired descent profile		٧				٧
236		DME / ILS DME confusion in assessing the final descent point / FAF		٧				٧
237		Flaws in manufacturer quality control process - Engine sensors		٧				
238		Flaws in aircraft system maintenance process definition - Engine sensors		٧				
239		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine sensors		٧				
240		Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.		V			٧	
241		Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT)		V			V	
242		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - antiice fluid HOT		V			٧	
243		Flaws in aircraft system maintenance process definition - Electrical wiring System		V			٧	
244		Lack of adherence to SOP in terms of safety best practices		V				
245		Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing		V			V	
246		Lack of adherence to AFM limitations for landing		٧				٧
247		Flaws in aircraft system maintenance process definition - ADI system components		٧				
248		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ADI system components		٧				
249		Flaws in manufacturer quality control process - ADI system components		V				
250		Incorrect use of automation - TOCW System					V	
251		Flaws in aircraft system maintenance process definition - TOCW System					V	
252		Unintuitive and / or error prone system manual - TOCW					٧	
253		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).		V				
254		Lack of adherence to the SOP in terms of critical maneuvre execution		V				İ



	Safety Performance	Descriptions		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
255		Applied de-icing / anti-icing method is not sufficient for predicted conditions		٧			V	
256		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System					٧	
257		Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination		>				
258		Incorrect use of automation - Anti-icing system		>				
259		Unintuitive and / or error prone system manual - Anti-icing system		V				
260		Lack of adherence to SOP in terms of pre-flight inspections -presence of anti-contamination covers on pitot static tube		٧				
261		Lack of adherence to SOP in terms of briefing and checklist before initiating of start of taxiing and take-off		V				
262		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Pitot static system components		٧				
263		Flaws in manufacturer quality control process - Pitot static system components		V				
264		Flaws in aircraft system maintenance process definition - Pitot static systems components		V				
265		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ADI		٧				
266		Flaws in manufacturer quality control process - ADI		٧				
267		Flaws in aircraft system maintenance process definition - ADI		V				
268		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ASI		٧				
269		Flaws in manufacturer quality control process - ASI		V				
270		Flaws in aircraft system maintenance process definition - ASI		V				
271		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine fuel distribution system		٧				
272		Flaws in manufacturer quality control process - Engine fuel distribution system		٧				
273		Flaws in aircraft system maintenance process definition - Engine fuel distribution system		٧				
274		Lack of adherence to AFM limitations for Take-off		٧				
275		Lack of adherence to SOP in terms of requested information support for other aircraft in terms of adverse weather conditions		٧				
276		Lack of adherence to SOP in terms of application of findings from weather report		٧				
277		Lack of adherence to SOP in terms of AFM limitations in terms of weigh and balance		٧				
278		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PFD		٧				



	Safety Performance	Discourage		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
279		Flaws in manufacturer quality control process - PFD		٧				
280		Flaws in aircraft system maintenance process definition - PFD		V				
281		Flaws in aircraft system maintenance process definition - stickshaker		V			٧	
282		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - stickshaker system components		٧			٧	
283		Flight below maneuvering speeds		V				
284		Lack of adherence to SOP in terms of awareness on supporting systems warning - stickshaker		V			V	
285		Incorrect weather report obtained by the flight crew		V				
286		Lack of adherence to SOP in terms of providing flight crew with current weather report		V				
287		Lack of adherence to SOP in terms of load sheet preparation and verification		V				
288		Lack of adherence to the current technology standards in terms of flight safety and efficiency - fuel tank allocation.		V				
289		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components					V	
290		Flaws in aircraft system maintenance process definition - Hydraulic System					V	
291		Lack of adherence to emergency procedures - recovery from severe FCS failure		٧				
292		Unintuitive and / or error prone system manual - On-board weather radar.		V				
293		Incorrect use of automation - On-board weather radar		V				
294		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - On-board weather radar		٧				
295		Flaws in manufacturer quality control process - On-board weather radar		V				
296		Flaws in aircraft system maintenance process definition - On-board weather radar		V				
297		Flaws in aircraft system maintenance process definition - Fire detection system components					٧	
298		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components					٧	
299		Flaws in manufacturer quality control process - Fire detection system components					٧	
300		Flaws in aircraft system maintenance process definition - Fire warning system					V	
301		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system					V	
302		Flaws in manufacturer quality control process - Fire warning system					٧	
303		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components					V	



	Safety Performance	Draguesara	Operational issue					
No.	Indicators	Precursors	1	2	3	4	5	6
304		Flaws in aircraft system maintenance process definition - Fire extinguishing system components					٧	
305		Flaws in manufacturer quality control process - Fire extinguishing system components					V	
306		Lack of or poor communication quality					V	
307		Lack of adherence of passengers to the recommendation: Fasten seat belt while seated		٧				
308		Lack of adherence to SOP in terms of "fasten your seat belt" information activation in passenger cabin during flight in turbulence conditions		V				
309		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.					V	
310		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.					٧	
311		Flaws in manufacturer quality control process - Communication equipment systems and components.					٧	
312		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Rudder components.		V				
313		Flaws in aircraft system maintenance process definition - Rudder components.		V				
314		Flaws in manufacturer quality control process - Rudder components.		V				
315		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Horizontal stabilizer components.		V				
316		Flaws in aircraft system maintenance process definition - Horizontal stabilizer components.		V				
317		Flaws in manufacturer quality control process - Horizontal stabilizer components.		٧				
318		Navigation deviation					V	
319		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Thrust reverse system in the engine.		٧				
320		Flaws in manufacturer quality control process - Thrust reverse system in the engine.		V				
321		Flaws in aircraft system maintenance process definition - Thrust reverse system in the engine.		٧				
322		Poor application of T/O & RTO procedure, aircraft handling					٧	
323		Inadequate airline / regulatory provider policy in terms of aware of the risks related to air travel		٧				
324		Lack of adherence to SOP in terms of pre-flight inspections - cargo securing quality		V				
325		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components					V	
326		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.					٧	
327		Flaws in manufacturer quality control process - Onboard navigational systems and components.					V	
328		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum		V			٧	٧



	Safety Performance	Dec courses		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
329		Lack of adherence to SOP in terms of pre-flight inspections - ice presence on aircraft		٧				
330		Tailwind component above limit						V
331		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FCS system or components		V				
332		Flaws in manufacturer quality control process - FCS system components		٧				
333		Flaws in aircraft system maintenance process definition - FCS systems or components		V				
334		Flaws in manufacturer quality control process - CPCS system and / or components		V				
335		Flaws in aircraft system maintenance process definition - CPCS system and / or components		V				
336		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - CPCS system and / or components		V				
337		Poor application of T/O & RTO procedure, braking initiation sequence					V	
338		Lack of adherence to TO procedure in terms of antiice protection		V				
339		Flaws in manufacturer quality control process - anti-ice fluid specifications (HOT)		V				
340		Lack of adherence to emergency procedures - flight deck smoke procedure		V				
341		Long / floating flare						V
342		Incorrect use of automation - CPCS		V				
343		Lack of English proficiency		V				
344		Incorrect or confusing / misleading ATC instructions		V				
345		Use of non-standard phraseology by pilot and/or controller		٧				
346		Lack of adherence to SOP for GND movements.		٧				
347		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment					V	
348		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.					V	
349		Error in calculation of necessary amount of fuel		V				
350		Lack of adherence to the SOP in terms of critical maneuvre execution - flare		V				
351		Extreme operation condition / poor maintenance quality / advanced life lenght		V				
352		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components		V				
353		Flaws in aircraft system maintenance process definition - Aircraft door system and / or components		٧				
354		Lack of adherence to the current technology standards in terms of flight safety and efficiency - engines location.		٧				
355		Late activation of pedal braking or takeover from autobrake, when so required		V				٧



	Safety Performance	Drocursors		Operational issue 2					
No.	Indicators	Precursors	1	2	3	4	5	6	
356		Delayed selection of reverse thrust		٧				V	
357		Late thrust reduction or power-on touchdown		V				V	
358		Failure to arm ground-spoilers		V				V	
359		Inappropriate selection of autobrake mode for given runway length and condition		V				V	
360		Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling		V			V		
361		Use of non-standard phraseology by pilot flying (PF) and/or pilot not flying (PNF)		٧					
362		Poor application of T/O & RTO procedure, computation of T/O parameters					V		
363		Flaws in manufacturer quality control process - Stickshaker system components		V			V		
364		Lack of adherence to AFM in terms of emergency procedures - engine failure		٧					
365		Inadequate stall recovery procedure for the aircraft					V		
366		Unintuitive and / or error prone system manual - ground radar.					٧		
367		Flaws in manufacturer quality control process - TOCW system components					٧		
368		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment		٧					
369		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Electrical / wiring system components		V					
370		Flaws in manufacturer quality control process - Electrical / wiring systems components		V					
131	Rate of bank angle alerts/flight	Pilot tiredness - Inadequate workload distribution		٧			V	٧	
132		Flaws in pilot requirements definition process and/or training methodology		V			V	V	
133		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology		٧			V	V	
134		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution		V			V	V	
135		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties		V			V	٧	
136		Aggressive maneuvering / overcontrolling		V				V	
137		Inadequate aircraft de-icing / anti-icing		٧			V		
138		Lack of adherence to the SOP in terms of critical indicators cross-checking		V					
139		Unintuitive and / or error prone system manual - FMS		٧				٧	
140		Incorrect use of automation - FMS		٧				٧	
141		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		V			V	٧	



	Safety Performance	Drocureore		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
142		Flaws in CRM training procedures		V			٧	V
143		Lack of adherence to the main CRM rules		V			V	V
144		Lack of adherence to SOP in terms of approach and landing		V				V
145		Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport in the case of adverse weather.		٧				٧
146		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.		V				V
147		Lack of adherence to SOP in terms of de-icing / anti-icing procedures.		V				
148		Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing		V				V
149		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path		٧				٧
150		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring		V			V	
151		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.		٧			٧	
152		Flaws in aircraft system maintenance process definition - Components of Wing control surface system.		V			V	
153		Flaws in manufacturer quality control process - Components of Wing control surface system.		V			V	
154		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Integrity of primary aircraft structure.		٧				
155		Flaws in manufacturer quality control process - Integrity of primary aircraft structure.		V				
156		Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.		V				
157		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.		V			V	
158		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		V			V	
159		Lack of adherence to SOP in terms of AFM limitations		V				
160		Lack of adherence to SARPs in terms of avoiding adverse weather conditions during flight		V				
161		Lack of adherence to emergency procedures - control recovery		V				V
162		Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure		V				V
163		Flaws in aircraft system maintenance process definition - Landing gear components.		V				
164		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fuel system components		٧				
165		Flaws in aircraft system maintenance process definition - Fuel system compoonents		V				
166		Flaws in manufacturer quality control process - Landing gear components.		V				



	Safety Performance	Precursors		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
167		Flaws in manufacturer quality control process - Fuel system components.		V				1
168		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Reduction gear in the engine		٧				
169		Flaws in manufacturer quality control process - Reduction gear in the engine.		V				
170		Flaws in aircraft system maintenance process definition - Reduction gear in the engine.		V				
171		Incorrect use of automation -Engine anti-ice system		V				
172		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Compressor in the engine		٧				
173		Flaws in manufacturer quality control process - Compressor in the engine.		V				
174		Flaws in aircraft system maintenance process definition - Compressor in the engine.		V				
175		Flaws in manufacturer quality control process - Engine accessory drive components.		V				
176		Flaws in aircraft system maintenance process definition - Engine accessory drive components.		V				
177		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine accessory drive components.		V				
178		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ECAM (or similar) system components.		٧				
179		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine anti-ice systems and / or components		٧				
180		Flaws in manufacturer quality control process - Engine anti-ice system and / or components		V				
181		Flaws in aircraft system maintenance process definition - Engine anti-ice system and / or components		V				
182		Flaws in aircraft system maintenance process definition - Oil distribution system		V				
183		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Oil distribution system		V				
184		Flaws in manufacturer quality control process - Oil distribution system		V				
185		Flaws in aircraft system maintenance process definition - ECAM (or similar) system components.		٧				
186		Flaws in manufacturer quality control process - ECAM (or similar) system components.		٧				
187		Lack of adherence to emergency procedures - Fuel starvation		٧				
188		Inadequate de-icing method applied		V				
189		Unintuitive and / or error prone system manual - Engine anti-icing system		٧				
190		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ECAM.		V				
191		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components		V				



	Safety Performance	Dranusara		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
192		Flaws in aircraft system maintenance process definition - Engine combustor		V				
193		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine combustor		٧				
194		Flaws in manufacturer quality control process - Engine combustor		V				
195		Flaws in aircraft system maintenance process definition - Engine turbine components		V				
196		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine turbine components		V				
197		Flaws in manufacturer quality control process - Engine turbine components		٧				<u> </u>
198		Flaws in manufacturer quality control process - Engine systems and / or components		V				
199		Unintuitive and / or error prone system manual - CPCS					V	V
200		Difference indications of independent aircraft speed / altitude or attitude indicators		V				
201		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Anti-icing system components		V				
202		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components		V			V	
203		Flaws in aircraft system maintenance process definition - APU systems and / or components		٧			V	<u> </u>
204		Excessive pitch attitude		V				
205		Excessive bank angle		V				
206		Flaws in manufacturer quality control process - Anti-icing system components		V				
207		Flaws in aircraft system maintenance process definition - Anti-icing systems components		٧				
208		High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,)		٧				٧
209		Late deceleration and configuration set-up for approach and landing		V				V
210		Unstabilized final approach (high, fast, steep,)		V				٧
211		Traffic controller tiredness - Inadequate workload distribution		V			V	
212		Flaws in traffic controller requirements definition process and/or training methodology		V			V	
213		Lack of or poor communication quality					٧	
214		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)		V			V	
215		Lack of adherence to AFM in terms of emergency procedures - engine restart procedure		V				-
216		Flaws in manufacturer quality control process - APU systems and / or components		٧				1



	Safety Performance	Draginague		Operational issue				
No.	Indicators	Precursors	1	2	3	4	5	6
217		Lack of adherence to SOP in terms of awareness on supporting systems warning		٧				
218		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)		V			V	
219		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine		V			٧	
220		Flaws in manufacturer quality control process - Autothrottle system in the engine.		٧			V	
221		Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.		٧			V	
222		Unintuitive and / or error prone system manual - ECAM		V				
223		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)		V			V	
224		Descent above desired descent profile		V				٧
225		DME / ILS DME confusion in assessing the final descent point / FAF		V				V
226		Flaws in manufacturer quality control process - Engine sensors		٧				
227		Flaws in aircraft system maintenance process definition - Engine sensors		V				
228		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine sensors		V				
229		Lack of adherence to SOP in terms of safety best practices		٧				
230		Go-around attempt after thrust reversers deployment		٧				٧
231		Lack of adherence to SOP in terms of aircraft icing (condition) monitoring		V				
232		Lack of adherence to AFM limitations for landing		V				٧
233		Lack of adherence to AFM in terms of emergency procedures - stall recovery		V				
234		Flaws in aircraft system maintenance process definition - ADI system components		V				
235		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ADI system components		V				
236		Flaws in manufacturer quality control process - ADI system components		V				
237		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).		V				
238		Lack of adherence to the SOP in terms of critical maneuvre execution		٧				
239		Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination		V				
240		Incorrect use of automation - Anti-icing system		٧				
241		Unintuitive and / or error prone system manual - Anti-icing system		٧				
242		Lack of adherence to SOP in terms of pre-flight inspections -presence of anti-contamination covers on pitot static tube		٧				_



	Safety Performance	Precursors		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
243		Lack of adherence to SOP in terms of briefing and checklist before initiating of start of taxiing and take-off		V				
244		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Pitot static system components		٧				
245		Flaws in manufacturer quality control process - Pitot static system components		V				
246		Flaws in aircraft system maintenance process definition - Pitot static systems components		V				
247		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ADI		٧				
248		Flaws in manufacturer quality control process - ADI		V				
249		Flaws in aircraft system maintenance process definition - ADI		V				
250		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ASI		٧				
251		Flaws in manufacturer quality control process - ASI		V				
252		Flaws in aircraft system maintenance process definition - ASI		V				
253		Lack of adherence to AFM limitations for Take-off		V				
254		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					V	
255		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PFD		٧				
256		Flaws in manufacturer quality control process - PFD		V				
257		Flaws in aircraft system maintenance process definition - PFD		V				
258		Lack of English proficiency					V	
259		Incorrect or confusing / misleading ATC instructions					V	
260		Use of non-standard phraseology by pilot and/or controller					V	
261		Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots					V	
262		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver					V	
263		Flight below maneuvering speeds		٧				
264		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components					V	
265		Flaws in manufacturer quality control process - Power supply system components					٧	
266		Lack of adherence of passengers to the recommendation: Fasten seat belt while seated		V				
267		Lack of adherence to SOP in terms of "fasten your seat belt" information activation in passenger cabin during flight in turbulence conditions		٧				



	Safety Performance	Precursors		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
268		Lack of adherence to SOP in terms of load sheet preparation and verification		V				
269		Lack of adherence to SOP in terms of AFM limitations in terms of weigh and balance		V				
270		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components					V	
271		Flaws in aircraft system maintenance process definition - Hydraulic System					٧	
272		Lack of adherence to emergency procedures - recovery from severe FCS failure		V				
273		Inadequate airline / regulatory provider policy in terms of aware of the risks related to air travel		V				
274		Flaws in aircraft system maintenance process definition - Fire detection system components					V	
275		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components					V	
276		Flaws in manufacturer quality control process - Fire detection system components					V	1
277		Flaws in aircraft system maintenance process definition - Fire warning system					V	
278		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system					V	
279		Flaws in manufacturer quality control process - Fire warning system					٧	
280		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components					V	
281		Flaws in aircraft system maintenance process definition - Fire extinguishing system components					٧	
282		Flaws in manufacturer quality control process - Fire extinguishing system components					V	
283		Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications					٧	
284		Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.					٧	
285		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence					V	
286		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity					V	
287		Takeoff without clearance					٧	
288		Landing without clearance					V	
289		Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings					٧	
290		Lack of adherence to SOP in terms of requested information support for other aircraft in terms of adverse weather conditions		V				
291		Incorrect weather report obtained by the flight crew		V				
292		Lack of adherence to SOP in terms of providing flight crew with current weather report		V				



	Safety Performance	Discourage		Ор	eration	al issu	e	-
No.	Indicators	Precursors	1	2	3	4	5	6
293		Lack of adherence to SOP in terms of application of findings from weather report		V			1	
294		Lack of adherence to the current technology standards in terms of flight safety and efficiency - fuel tank allocation.		V			1	
295		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.					V	
296		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.					٧	
297		Flaws in manufacturer quality control process - Communication equipment systems and components.					V	
298		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Rudder components.		V				
299		Flaws in aircraft system maintenance process definition - Rudder components.		V			<u> </u>	
300		Flaws in manufacturer quality control process - Rudder components.		V				
301		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Horizontal stabilizer components.		٧				
302		Flaws in aircraft system maintenance process definition - Horizontal stabilizer components.		V				
303		Flaws in manufacturer quality control process - Horizontal stabilizer components.		V				
304		Lack of adherence to Rules of the Air - adherence to Controller clearance					V	
305		Navigation deviation					V	
306		Flaws in Airspace and Air Traffic planning procedures design process					V	
307		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Thrust reverse system in the engine.		٧				
308		Flaws in manufacturer quality control process - Thrust reverse system in the engine.		V				
309		Flaws in aircraft system maintenance process definition - Thrust reverse system in the engine.		V				
310		Flaws in airport capacity management process					V	
311		Unintuitive and / or error prone system manual - On-board weather radar.		V				
312		Incorrect use of automation - On-board weather radar		V				
313		Lack of adherence to SOP for take-off procedure in terms of time limitation for take-off preparation.					V	
314		Lack of adherence to SOP in terms of pre-flight inspections - cargo securing quality		٧				
315		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - On-board weather radar		٧				
316		Flaws in manufacturer quality control process - On-board weather radar		V			-	
317		Flaws in aircraft system maintenance process definition - On-board weather radar		٧				
318		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components					V	



	Safety Performance	Discourage		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
319		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.					٧	
320		Flaws in manufacturer quality control process - Onboard navigational systems and components.					V	
321		Error in calculation of necessary amount of fuel		V				V
322		Late rejected takeoff decision / initiation					V	
323		Tailwind component above limit						٧
324		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FCS system or components		٧				
325		Flaws in manufacturer quality control process - FCS system components		V				
326		Flaws in aircraft system maintenance process definition - FCS systems or components		٧				
327		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine fuel distribution system		٧				
328		Flaws in manufacturer quality control process - Engine fuel distribution system		V				
329		Flaws in aircraft system maintenance process definition - Engine fuel distribution system		V				
330		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum		V			V	٧
331		Poor application of T/O & RTO procedure, failure recognition and preparedness					V	
332		Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations					٧	
333		Long / floating flare						V
334		Lack of adherence to the current technology standards in terms of flight safety and efficiency - engines location.		V				
335		Late activation of pedal braking or takeover from autobrake, when so required		V				٧
336		Delayed selection of reverse thrust		V				٧
337		Late thrust reduction or power-on touchdown		V				V
338		Failure to arm ground-spoilers		V				٧
339		Inappropriate selection of autobrake mode for given runway length and condition		V				٧
340		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment					V	
341		Poor application of T/O & RTO procedure, braking initiation sequence	1				٧	
342		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.	1				٧	
343		Use of non-standard phraseology by pilot flying (PF) and/or pilot not flying (PNF)	†	V				
344		Lack of adherence to SOP in terms of necessary amount of fuel	1	V				٧



	Safety Performance	Dragueses		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
345		Poor application of T/O & RTO procedure, computation of T/O parameters					V	
346		Lack of adherence to AFM in terms of emergency procedures - engine failure		V				
347		Flaws in aircraft system maintenance process definition - Electrical wiring System		٧				
348		Taxiing without clearance		V				
349		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Electrical / wiring system components		٧				
350		Flaws in manufacturer quality control process - Electrical / wiring systems components		V			l	
131	Rate of near CFIT/flight	Pilot tiredness - Inadequate workload distribution		V	V		V	V
132		Flaws in pilot requirements definition process and/or training methodology		V	V		V	V
133		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology		V	V		V	V
134		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution		V	V		V	V
135		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties		٧	٧			٧
136		Lack of adherence to SOP in terms of approach and landing		V	٧			V
137		Incorrect use of automation - FMS		V	٧			V
138		Unintuitive and / or error prone system manual - FMS		V	٧			V
139		Aggressive maneuvering / overcontrolling		V				٧
140		Flaws in CRM training procedures		V	V			V
141		Lack of adherence to the main CRM rules		٧	V		1	V
142		Lack of adherence to the SOP in terms of critical indicators cross-checking		٧	V		1	
143		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.		V			V	
144		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fuel system components		٧				
145		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		٧			٧	V
146		Flaws in aircraft system maintenance process definition - Fuel system compoonents		V				
147		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.		٧	٧			V
148		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components		٧				
149		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path		٧				٧



	Safety Performance	Precursors		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
150		Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing		٧				٧
151		Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport in the case of adverse weather.		٧				٧
152		Flaws in manufacturer quality control process - Engine systems and / or components		V				
153		Inadequate aircraft de-icing / anti-icing		V			٧	
154		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Integrity of primary aircraft structure.		٧				
155		Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.		٧				
156		Flaws in manufacturer quality control process - Integrity of primary aircraft structure.		V				
157		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.		٧			V	
158		Flaws in aircraft system maintenance process definition - Components of Wing control surface system.		V			V	ł
159		Flaws in manufacturer quality control process - Components of Wing control surface system.		V			٧	
160		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)		٧	V		V	
161		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring		٧				
162		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		V				
163		Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure		V				V
164		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)		V	V		V	
165		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)		V	V		V	
166		Lack of adherence to emergency procedures - control recovery		V				٧
167		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components		٧			٧	
168		Flaws in aircraft system maintenance process definition - APU systems and / or components		V			٧	
169		Lack of adherence to SOP in terms of AFM limitations		V				
170		Flaws in manufacturer quality control process - Landing gear components.		٧				
171		Flaws in aircraft system maintenance process definition - Landing gear components.		V				
172		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).		٧	V			
173		Flaws in traffic controller requirements definition process and/or training methodology		V	V			
174		Lack of adherence to SARPs in terms of avoiding adverse weather conditions during flight		٧				· · · · · · · · · · · · · · · · · · ·



	Safety Performance	Descriptions		Op	V V V V V V V V V V V V V V V V V V V						
No.	Indicators	Precursors	1	2	3	4	5	6			
175		Flaws in manufacturer quality control process - Fuel system components.		V							
176		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components			V		V				
177		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.			٧		٧				
178		Flaws in manufacturer quality control process - Onboard navigational systems and components.			V		V	ļ			
179		Traffic controller tiredness - Inadequate workload distribution		V	V						
180		Incorrect use of automation -Engine anti-ice system		V							
181		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine anti-ice systems and / or components		٧							
182		Flaws in manufacturer quality control process - Engine anti-ice system and / or components		٧							
183		Flaws in aircraft system maintenance process definition - Engine anti-ice system and / or components		V							
184		Lack of or poor communication quality			V		V				
185		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ECAM.		V							
186		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Reduction gear in the engine		٧							
187		Flaws in manufacturer quality control process - Reduction gear in the engine.		V							
188		Flaws in aircraft system maintenance process definition - Reduction gear in the engine.		V							
189		Lack of adherence to emergency procedures - Fuel starvation		٧							
190		Inadequate de-icing method applied		V							
191		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Compressor in the engine		٧							
192		Flaws in manufacturer quality control process - Compressor in the engine.		V				ļ			
193		Flaws in aircraft system maintenance process definition - Compressor in the engine.		V							
194		Flaws in manufacturer quality control process - Engine accessory drive components.		V							
195		Flaws in aircraft system maintenance process definition - Engine accessory drive components.		٧							
196		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine accessory drive components.		V							
197		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ECAM (or similar) system components.		V							
198		Flaws in aircraft system maintenance process definition - ECAM (or similar) system components.		>							
199		Unintuitive and / or error prone system manual - Engine anti-icing system		V			_ _				



	Safety Performance	Draguesas		Ор	eration	al issu	<u> </u>	
No.	Indicators	Precursors	1	2	3	4	5	6
200		Lack of adherence to SOP in terms of de-icing / anti-icing procedures.		V				
201		Flaws in manufacturer quality control process - ECAM (or similar) system components.		V				
202		Flaws in aircraft system maintenance process definition - Oil distribution system		V				
203		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Oil distribution system		٧				
204		Flaws in manufacturer quality control process - Oil distribution system		V				
205		Flaws in manufacturer quality control process - APU systems and / or components		V				
206		Lack of English proficiency		V	V			
207		Use of non-standard phraseology by pilot and/or controller		V	V			
208		Flaws in aircraft system maintenance process definition - Engine combustor		V				
209		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine combustor		V				
210		Flaws in manufacturer quality control process - Engine combustor		V				
211		Flaws in aircraft system maintenance process definition - Engine turbine components		V				
212		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine turbine components		V				
213		Flaws in manufacturer quality control process - Engine turbine components		V				
214		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS)			V			
215		Failure to check navigation accuracy before approach			V			
216		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. Navigational aid failure.			V			
217		Not recognized ground Navaids System failure not reflected in NOTAM messages			V			
218		Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS)			V			
219		Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS)			V			
220		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver			V			
221		Current airport diagram not reflecting critical changes			V			
222		Altimeter setting error			V			
223		Lack of adherence to SOP for AIR operations in terms of controller error in approach clearence instruction			V			
224		Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination			V			
225		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance		V			V	



	Safety Performance	Discourses		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
		with requirements - Hydraulic system components						
226		Flaws in aircraft system maintenance process definition - Hydraulic System		V			V	
227		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components		V			V	
228		Flaws in aircraft system maintenance process definition - Fire detection system components		V			V	
229		Flaws in manufacturer quality control process - Fire detection system components		V			V	
230		Flaws in aircraft system maintenance process definition - Fire warning system		V			V	
231		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system		V			٧	
232		Flaws in manufacturer quality control process - Fire warning system		V			V	
233		Flaws in aircraft system maintenance process definition - Electrical wiring System		٧				
234		Separation of structural element / component of the aircraft during take-off or landing		V				
235		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Electrical / wiring system components		V				
236		Flaws in manufacturer quality control process - Electrical / wiring systems components		V				
237		Lack of adherence to SOP in terms of fuelling procedure		V				
238		Inadequate maintenance of fire vulnerable aircraft parts or components		V				
239		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements in terms of fire resistance		V				
240		Lack of adherence to regulations concerning transport of DGR goods		V				
241		Lack of adherence to engine limitations		V				
242		Flaws in aircraft system maintenance process definition - Engine systems and / or components		٧				
243		Unintuitive and / or error prone system manual - CPCS		V			V	V
244		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of fire detection / warning or / and extinguishing system.		V				
245		Imbalanced and inaproppriate relation between cpt and his subordinates			V			
246		High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,)		٧				٧
247		Late deceleration and configuration set-up for approach and landing		٧				V
248		Unstabilized final approach (high, fast, steep,)		٧				٧
249		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components		٧			V	



	Safety Performance	Dec courses		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
250		Flaws in aircraft system maintenance process definition - Fire extinguishing system components		٧			V	
251		Flaws in manufacturer quality control process - Fire extinguishing system components		V			V	
252		Lack of adherence to AFM in terms of emergency procedures - engine restart procedure		V				
253		Lack of adherence to SOP in terms of awareness on supporting systems warning		V				
254		Unintuitive and / or error prone system manual - ECAM		V				
255		Descent above desired descent profile		V				V
256		DME / ILS DME confusion in assessing the final descent point / FAF		V				V
257		Flaws in manufacturer quality control process - Engine sensors		٧				
258		Flaws in aircraft system maintenance process definition - Engine sensors		V				
259		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine sensors		٧				
260		Lack of adherence to AFM in terms of emergency procedures - fire detection and extinguishing procedure		V				
261		Go-around attempt after thrust reversers deployment		V				٧
262		Lack of adherence to AFM limitations for landing		٧				٧
263		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine		٧			٧	
264		Flaws in manufacturer quality control process - Autothrottle system in the engine.		V			V	
265		Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.		V			V	
266		Inadequate effectivenes of fire extinguishing system		V				
267		Unintuitive and / or error prone system manual - fire extinguishing system		٧				
268		Excessive pitch attitude		٧				
269		Excessive bank angle		٧				
270		Lack of adherence to the SOP in terms of critical maneuvre execution		٧				
271		Difference indications of independent aircraft speed / altitude or attitude indicators		V				
272		Lack of adherence to SOP in terms of safety best practices		V				
273		Flaws in aircraft system maintenance process definition - ADI system components		٧				
274		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ADI system components		٧				
275		Flaws in manufacturer quality control process - ADI system components		٧				
276		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance					V	



	Safety Performance	Discourage		Ор	eration	al issu	e	-
No.	Indicators	Precursors	1	2	3	4	5	6
		with requirements - Power supply system components						
277		Flaws in manufacturer quality control process - Power supply system components					V	
278		Navigation deviation					V	
279		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.					٧	
280		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.					٧	
281		Flaws in manufacturer quality control process - Communication equipment systems and components.					V	
282		Incorrect or confusing / misleading ATC instructions		V	V			
283		Error in calculation of necessary amount of fuel		V				V
284		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components		V				
285		Flaws in aircraft system maintenance process definition - Aircraft door system and / or components		V				
286		Tailwind component above limit						V
287		Long / floating flare						V
288		Flaws in manufacturer quality control process - CPCS system and / or components		V				
289		Flaws in aircraft system maintenance process definition - CPCS system and / or components		V				
290		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - CPCS system and / or components		٧				
291		Lack of adherence to SOP for GND movements.		V				
292		Flight below maneuvering speeds		V				
293		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					٧	
294		Poor application of T/O & RTO procedure, failure recognition and preparedness					V	
295		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Rudder components.		٧				
296		Flaws in aircraft system maintenance process definition - Rudder components.		V				
297		Flaws in manufacturer quality control process - Rudder components.		V				
298		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Horizontal stabilizer components.		٧				
299		Flaws in aircraft system maintenance process definition - Horizontal stabilizer components.		٧	_			
300		Flaws in manufacturer quality control process - Horizontal stabilizer components.		٧				
301		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance		V				



	Safety Performance	Precursors		Op	eration	al issu	e	
No.	Indicators	Frecursors	1	2	3	4	5	6
		with requirements - Thrust reverse system in the engine.	ļ					
302		Flaws in manufacturer quality control process - Thrust reverse system in the engine.		V				
303		Flaws in aircraft system maintenance process definition - Thrust reverse system in the engine.		V				
304		Lack of adherence to emergency procedures - flight deck smoke procedure		V				
305		Lack of adherence to the SOP in terms of critical maneuvre execution - flare		V				
306		Extreme operation condition / poor maintenance quality / advanced life lenght		V				
307		Incorrect use of automation - CPCS		V				
308		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum		٧			٧	٧
309		Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain)			V			
310		Premature descent to DA(H) before G/S intercept or premature descent to MDA(H) before final-descent-point / FAF			V			
311		Premature descent below MDA(H) before reaching the visual-descent-point (VDP)			٧			
312		Flight below desired flight path during initial and/or final approach			V			
313		Continued approach, when below DA(H) or MDA(H), after loss of visual references			٧			
314		Late or inadequate response to MSAW warning			V			
315		Failure to go-around, when so required			٧			
316		Failure to follow published missed-approach procedure			٧			
317		Lack of adherence to AFM in terms of emergency procedures - stall recovery		V				
318		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of MSAW system.			V			
319		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MSAW System			٧			
320		Lack of adherence to the current technology standards in terms of flight safety and efficiency - engines location.		V				
321		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. MSAW warning.			V			
322		Late activation of pedal braking or takeover from autobrake, when so required		V				٧
323		Delayed selection of reverse thrust		V				V
324		Late thrust reduction or power-on touchdown		٧				٧
325		Failure to arm ground-spoilers		٧				٧
326		Inappropriate selection of autobrake mode for given runway length and condition		٧				٧
327		Use of non-standard phraseology by pilot flying (PF) and/or pilot not flying (PNF)		V				



	Safety Performance	Descriptions		Ор	eration	al issu	e	-
No.	Indicators	Precursors	1	2	3	4	5	6
328		Lack of adherence to SOP in terms of necessary amount of fuel		٧				V
329		Lack of adherence to emergency procedures - recovery from severe FCS failure		V				
330		Lack of adherence to AFM in terms of emergency procedures - engine failure		٧				
331		Flaws in aircraft system maintenance process definition - stickshaker			V			
332		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment					V	
333		Poor application of T/O & RTO procedure, braking initiation sequence					V	
334		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.					V	
335		Lack of adherence to SOP for approach and landing		٧				
336		Poor application of T/O & RTO procedure, computation of T/O parameters					V	
337		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS			V			
338		Flaws in aircraft system maintenance process definition - GPWS system components			V			
339		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - GPWS system components			٧			
340		Flaws in manufacturer quality control process - GPWS system components			V			
131	Rate of deviation from glideslope/approach	Pilot tiredness - Inadequate workload distribution		V	٧			V
132		Flaws in pilot requirements definition process and/or training methodology		V	٧			V
133		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology		V	٧			V
134		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution		V	٧			V
135		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties		V	٧			V
136		Incorrect use of automation - FMS		V	V			V
137		Unintuitive and / or error prone system manual - FMS		٧	٧			V
138		Lack of adherence to SOP in terms of approach and landing		V	V			V
139		Lack of adherence to the SOP in terms of critical indicators cross-checking		V	٧			
140		Flaws in CRM training procedures		٧	٧			٧
141		Lack of adherence to the main CRM rules		٧	٧			٧
142		Aggressive maneuvering / overcontrolling		٧				٧
143		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.		V				
144		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance		V				



	Safety Performance	Discourse.		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
		with requirements - Fuel system components	ļ					
145		Flaws in aircraft system maintenance process definition - Fuel system compoonents		V				
146		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.		٧	٧			V
147		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components		٧				
148		Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather.		٧				٧
149		Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing		V				V
150		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path		٧				٧
151		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		٧				V
152		Flaws in manufacturer quality control process - Engine systems and / or components		V				
153		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).		٧	٧			٧
154		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring		V				
155		Flaws in traffic controller requirements definition process and/or training methodology			V			V
156		Inadequate aircraft de-icing / anti-icing		V				
157		Lack of adherence to SOP in terms of AFM limitations		V				
158		Traffic controller tiredness - Inadequate workload distribution			V			٧
159		Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure		V				V
160		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Integrity of primary aircraft structure.		٧				
161		Flaws in manufacturer quality control process - Integrity of primary aircraft structure.		V				
162		Flaws in manufacturer quality control process - Fuel system components.		V				
163		Lack of adherence to emergency procedures - control recovery		V				٧
164		Lack of adherence to SARPs in terms of avoiding adverse weather conditions during flight		V				
165		Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.		٧				
166		Flaws in manufacturer quality control process - Landing gear components.		٧				
167		Flaws in aircraft system maintenance process definition - Landing gear components.		٧				
168		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		V				



	Safety Performance	Durannana		Op	Operational issue 2 3 4 5						
No.	Indicators	Precursors	1	2	3	4	5	6			
169		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.		٧							
170		Flaws in aircraft system maintenance process definition - Components of Wing control surface system.		V							
171		Flaws in manufacturer quality control process - Components of Wing control surface system.		V							
172		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine anti-ice systems and / or components		٧							
173		Flaws in manufacturer quality control process - Engine anti-ice system and / or components		V							
174		Flaws in aircraft system maintenance process definition - Engine anti-ice system and / or components		V							
175		Incorrect use of automation -Engine anti-ice system		٧							
176		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)		V	V						
177		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Reduction gear in the engine		٧							
178		Flaws in manufacturer quality control process - Reduction gear in the engine.		V							
179		Flaws in aircraft system maintenance process definition - Reduction gear in the engine.		V							
180		Inadequate de-icing method applied		٧							
181		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Compressor in the engine		٧							
182		Flaws in manufacturer quality control process - Compressor in the engine.		V							
183		Flaws in aircraft system maintenance process definition - Compressor in the engine.		٧							
184		Flaws in manufacturer quality control process - Engine accessory drive components.		٧							
185		Flaws in aircraft system maintenance process definition - Engine accessory drive components.		V							
186		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine accessory drive components.		٧							
187		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ECAM (or similar) system components.		V							
188		Lack of adherence to emergency procedures - Fuel starvation		V							
189		Flaws in aircraft system maintenance process definition - Oil distribution system		V							
190		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Oil distribution system		٧							
191		Flaws in manufacturer quality control process - Oil distribution system		V							
192		Flaws in aircraft system maintenance process definition - ECAM (or similar) system components.		V							



	Safety Performance	Data a supra a supra a supra a supra a supra a supra a supra a supra a supra a supra a supra a supra a supra a		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
193		Unintuitive and / or error prone system manual - Engine anti-icing system		٧				
194		Lack of adherence to SOP in terms of de-icing / anti-icing procedures.		V				
195		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ECAM.		٧				
196		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)		V	V			
197		Flaws in manufacturer quality control process - ECAM (or similar) system components.		V				
198		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)		٧	V			
199		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components		٧				
200		Flaws in manufacturer quality control process - APU systems and / or components		٧				
201		Flaws in aircraft system maintenance process definition - APU systems and / or components		٧				
202		Flaws in aircraft system maintenance process definition - Engine combustor		V				
203		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine combustor		V				
204		Flaws in manufacturer quality control process - Engine combustor		V				
205		Flaws in aircraft system maintenance process definition - Engine turbine components		V				
206		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine turbine components		٧				
207		Flaws in manufacturer quality control process - Engine turbine components		V				
208		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS)			V			
209		Failure to check navigation accuracy before approach			٧			<u> </u>
210		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. Navigational aid failure.			٧			
211		Not recognized ground Navaids System failure not reflected in NOTAM messages			٧			
212		Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS)			V			
213		Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS)			V			
214		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components			V			
215		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.			V			
216		Flaws in manufacturer quality control process - Onboard navigational systems and components.			٧			
217		Lack of English proficiency			V			
218		Use of non-standard phraseology by pilot and/or controller			V		Ţ	



	Safety Performance	Precursors		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
219		Lack of or poor communication quality			V			
220		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver			V			
221		Current airport diagram not reflecting critical changes			V			
222		Altimeter setting error			V			
223		Lack of adherence to SOP for AIR operations in terms of controller error in approach clearence instruction			V			
224		Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination			V			
225		Flaws in aircraft system maintenance process definition - Electrical wiring System		V				
226		Separation of structural element / component of the aircraft during take-off or landing		V				
227		Flaws in aircraft system maintenance process definition - Engine systems and / or components		V				
228		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Electrical / wiring system components		٧				
229		Flaws in manufacturer quality control process - Electrical / wiring systems components		V				
230		Lack of adherence to SOP in terms of fuelling procedure		V				
231		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components		٧				
232		Flaws in aircraft system maintenance process definition - Hydraulic System		V				
233		Inadequate maintenance of fire vulnerable aircraft parts or components		V				
234		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements in terms of fire resistance		٧				
235		Lack of adherence to regulations concerning transport of DGR goods		V				
236		Lack of adherence to engine limitations		V				
237		High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,)		٧				٧
238		Late deceleration and configuration set-up for approach and landing		V				V
239		DME / ILS DME confusion in assessing the final descent point / FAF		V				V
240		Unstabilized final approach (high, fast, steep,)		V				V
241		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components		٧				
242		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of fire detection / warning or / and extinguishing system.		٧				
243		Imbalanced and inaproppriate relation between cpt and his subordinates			V		Ţ	



	Safety Performance	Duranusana	T	Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
244		Flaws in aircraft system maintenance process definition - Fire detection system components		٧				
245		Flaws in manufacturer quality control process - Fire detection system components		V				
246		Flaws in aircraft system maintenance process definition - Fire warning system		V				
247		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system		V				
248		Flaws in manufacturer quality control process - Fire warning system		V			1	
249		Descent above desired descent profile		V			1	V
250		Lack of adherence to AFM limitations for landing		V				V
251		Lack of adherence to AFM in terms of emergency procedures - engine restart procedure		V				
252		Lack of adherence to SOP in terms of awareness on supporting systems warning		V				
253		Unintuitive and / or error prone system manual - ECAM		V			1	
254		Flaws in manufacturer quality control process - Engine sensors		٧				
255		Flaws in aircraft system maintenance process definition - Engine sensors		V			1	
256		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine sensors		V				
257		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components		V				
258		Lack of adherence to AFM in terms of emergency procedures - fire detection and extinguishing procedure		V			1	
259		Go-around attempt after thrust reversers deployment		V				V
260		Flaws in aircraft system maintenance process definition - Fire extinguishing system components		V				
261		Flaws in manufacturer quality control process - Fire extinguishing system components		V				
262		Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared					1	V
263		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System.						V
264		Inadequate effectivenes of fire extinguishing system		V			1	
265		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system						٧
266		Flaws in manufacturer quality control process - PWS system components						V
267		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.					-	٧
268		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - LLWAS system						V
269		Unintuitive and / or error prone system manual - fire extinguishing system		V				



	Safety Performance	Discourage		Ор	eration	al issu	<u> </u>	
No.	Indicators	Precursors	1	2	3	4	5	6
270		Unintuitive and / or error prone system manual - CPCS						٧
271		Excessive pitch attitude		V				
272		Excessive bank angle		V				
273		Lack of adherence to the SOP in terms of critical maneuvre execution		V				
274		Difference indications of independent aircraft speed / altitude or attitude indicators		V				
275		Lack of adherence to SOP in terms of safety best practices		V				
276		Flaws in aircraft system maintenance process definition - ADI system components		V				
277		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ADI system components		٧				
278		Flaws in manufacturer quality control process - ADI system components		V				1
279		Lack of adherence to emergency procedures - WEM						V
280		Tailwind component above limit						٧
281		Error in calculation of necessary amount of fuel		٧				٧
282		Flight below maneuvering speeds		٧				
283		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Rudder components.		٧				
284		Flaws in aircraft system maintenance process definition - Rudder components.		V				
285		Flaws in manufacturer quality control process - Rudder components.		V				
286		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Horizontal stabilizer components.		٧				
287		Flaws in aircraft system maintenance process definition - Horizontal stabilizer components.		٧				
288		Flaws in manufacturer quality control process - Horizontal stabilizer components.		V				
289		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine		٧				
290		Flaws in manufacturer quality control process - Autothrottle system in the engine.		V				
291		Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.		٧				
292		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Thrust reverse system in the engine.		V				
293		Flaws in manufacturer quality control process - Thrust reverse system in the engine.		٧				
294		Flaws in aircraft system maintenance process definition - Thrust reverse system in the engine.		٧				
295		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice		V				V



	Safety Performance	Precursors		Ор	eration	al issu	2	
No.	Indicators	FIECUISOIS	1	2	3	4	5	6
		presence / or runway surface friction rate below minimum						
296		Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain)			V			
297		Premature descent to DA(H) before G/S intercept or premature descent to MDA(H) before final-descent-point / FAF			V			
298		Premature descent below MDA(H) before reaching the visual-descent-point (VDP)			V			
299		Flight below desired flight path during initial and/or final approach			V			
300		Continued approach, when below DA(H) or MDA(H), after loss of visual references			V			
301		Late or inadequate response to MSAW warning			V			
302		Failure to go-around, when so required			V			
303		Failure to follow published missed-approach procedure			V			
304		Lack of adherence to AFM in terms of emergency procedures - stall recovery		V				
305		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of MSAW system.			V			
306		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MSAW System			٧			
307		Lack of adherence to the current technology standards in terms of flight safety and efficiency - engines location.		٧				
308		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. MSAW warning.			V			
309		Late activation of pedal braking or takeover from autobrake, when so required		V				٧
310		Delayed selection of reverse thrust		V				٧
311		Late thrust reduction or power-on touchdown		V				٧
312		Failure to arm ground-spoilers		V				٧
313		Inappropriate selection of autobrake mode for given runway length and condition		V				٧
314		Lack of adherence to AFM limitations for Take-off		V				
315		Use of non-standard phraseology by pilot flying (PF) and/or pilot not flying (PNF)		V				
316		Lack of adherence to SOP in terms of necessary amount of fuel		V				V
317		Lack of adherence to emergency procedures - recovery from severe FCS failure		V				
318		Lack of adherence to AFM in terms of emergency procedures - engine failure		V				
319		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine fuel distribution system		٧				
320		Flaws in manufacturer quality control process - Engine fuel distribution system		V				
321		Flaws in aircraft system maintenance process definition - Engine fuel distribution system		٧				



	Safety Performance	Decompose		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
322		Incorrect or confusing / misleading ATC instructions			٧			
323		Flaws in aircraft system maintenance process definition - stickshaker			V			
324		Lack of adherence to SOP for approach and landing		V				
325		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS			V			
326		Flaws in aircraft system maintenance process definition - GPWS system components			V			
327		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - GPWS system components			٧			
328		Flaws in manufacturer quality control process - GPWS system components			V			
131	Rate of deviation from localizer/approach	Pilot tiredness - Inadequate workload distribution		V	٧			٧
132		Flaws in pilot requirements definition process and/or training methodology		٧	٧			٧
133		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties		٧	٧			V
134		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology		V	٧			٧
135		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution		V	V			٧
136		Lack of adherence to SOP in terms of approach and landing		V	V			V
137		Incorrect use of automation - FMS		V	V			٧
138		Unintuitive and / or error prone system manual - FMS		V	V			V
139		Flaws in CRM training procedures		V	٧			٧
140		Lack of adherence to the main CRM rules		V	V			V
141		Lack of adherence to the SOP in terms of critical indicators cross-checking		V	٧			
142		Aggressive maneuvering / overcontrolling		V				٧
143		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.		٧	٧			٧
144		Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing		V				V
145		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path		٧				٧
146		Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport in the case of adverse weather.		V				V
147		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		V				V
148		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.		V			l 7	



	Safety Performance	December 1		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
149		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring		V				
150		Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure		V				٧
151		Inadequate aircraft de-icing / anti-icing		V				
152		Lack of adherence to SOP in terms of AFM limitations		V				
153		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Integrity of primary aircraft structure.		٧				
154		Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.		V				
155		Flaws in manufacturer quality control process - Integrity of primary aircraft structure.		V				
156		Flaws in manufacturer quality control process - Landing gear components.		V				
157		Flaws in aircraft system maintenance process definition - Landing gear components.		V				
158		Lack of adherence to emergency procedures - control recovery		V				٧
159		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		V				
160		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fuel system components		٧				
161		Flaws in aircraft system maintenance process definition - Fuel system compoonents		V				
162		Lack of adherence to SARPs in terms of avoiding adverse weather conditions during flight		V				
163		Flaws in manufacturer quality control process - Fuel system components.		V				
164		Incorrect use of automation -Engine anti-ice system		V				
165		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine anti-ice systems and / or components		٧				
166		Flaws in manufacturer quality control process - Engine anti-ice system and / or components		V				
167		Flaws in aircraft system maintenance process definition - Engine anti-ice system and / or components		V				
168		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ECAM.		V				
169		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Reduction gear in the engine		٧				
170		Flaws in manufacturer quality control process - Reduction gear in the engine.		V				
171		Flaws in aircraft system maintenance process definition - Reduction gear in the engine.		V				
172		Lack of adherence to emergency procedures - Fuel starvation		V				
173		Inadequate de-icing method applied		٧				
174		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Compressor in the engine		٧				



	Safety Performance	P		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
175		Flaws in manufacturer quality control process - Compressor in the engine.		٧				
176		Flaws in aircraft system maintenance process definition - Compressor in the engine.		٧				
177		Flaws in manufacturer quality control process - Engine accessory drive components.		٧				
178		Flaws in aircraft system maintenance process definition - Engine accessory drive components.		٧				
179		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine accessory drive components.		V				
180		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ECAM (or similar) system components.		V				
181		Flaws in aircraft system maintenance process definition - ECAM (or similar) system components.		V			,	
182		Unintuitive and / or error prone system manual - Engine anti-icing system		V				
183		Lack of adherence to SOP in terms of de-icing / anti-icing procedures.		٧				
184		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.		V				
185		Flaws in aircraft system maintenance process definition - Components of Wing control surface system.		V			i n	
186		Flaws in manufacturer quality control process - Components of Wing control surface system.		٧				
187		Flaws in manufacturer quality control process - ECAM (or similar) system components.		V				
188		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components		V				
189		Flaws in aircraft system maintenance process definition - Oil distribution system		٧				
190		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Oil distribution system		V				
191		Flaws in manufacturer quality control process - Oil distribution system		٧				
192		Flaws in traffic controller requirements definition process and/or training methodology			V			
193		Traffic controller tiredness - Inadequate workload distribution			V			
194		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)			V			
195		Flaws in manufacturer quality control process - Engine systems and / or components		٧				
196		Flaws in aircraft system maintenance process definition - Engine combustor		٧				
197		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine combustor		V				
198		Flaws in manufacturer quality control process - Engine combustor		٧				
199		Flaws in aircraft system maintenance process definition - Engine turbine components		٧				



	Safety Performance	Dragiusaus		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
200		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine turbine components		V				
201		Flaws in manufacturer quality control process - Engine turbine components		V				1
202		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS)			V			
203		Failure to check navigation accuracy before approach			V			
204		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. Navigational aid failure.			V			
205		Not recognized ground Navaids System failure not reflected in NOTAM messages			V			
206		Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS)			V			
207		Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS)			V			
208		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components			V			
209		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.			V			
210		Flaws in manufacturer quality control process - Onboard navigational systems and components.			V			
211		Lack of English proficiency			V			
212		Use of non-standard phraseology by pilot and/or controller			٧			
213		Lack of or poor communication quality			V			
214		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver			V			
215		Current airport diagram not reflecting critical changes			V			
216		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).			٧			
217		Altimeter setting error			V			1
218		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)			V			
219		Lack of adherence to SOP for AIR operations in terms of controller error in approach clearence instruction			V			
220		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)			V			
221		Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination			٧			
222		Imbalanced and inaproppriate relation between cpt and his subordinates			V			
223		Lack of adherence to AFM in terms of emergency procedures - engine restart procedure		V				
224		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components		٧				



	Safety Performance	Precursors		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
225		Flaws in manufacturer quality control process - APU systems and / or components		V				
226		Flaws in aircraft system maintenance process definition - APU systems and / or components		V				
227		Lack of adherence to SOP in terms of awareness on supporting systems warning		٧				
228		Unintuitive and / or error prone system manual - ECAM		V				
229		Descent above desired descent profile		V				٧
230		High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,)		V				٧
231		Late deceleration and configuration set-up for approach and landing		V				V
232		DME / ILS DME confusion in assessing the final descent point / FAF		V				V
233		Unstabilized final approach (high, fast, steep,)		V				V
234		Flaws in manufacturer quality control process - Engine sensors		٧				
235		Flaws in aircraft system maintenance process definition - Engine sensors		V				
236		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine sensors		٧				
237		Go-around attempt after thrust reversers deployment		V				٧
238		Lack of adherence to AFM limitations for landing		V				V
239		Error in calculation of necessary amount of fuel		٧				V
240		Unintuitive and / or error prone system manual - CPCS						V
241		Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain)			V			
242		Premature descent to DA(H) before G/S intercept or premature descent to MDA(H) before final-descent-point / FAF			V			
243		Premature descent below MDA(H) before reaching the visual-descent-point (VDP)			V			
244		Flight below desired flight path during initial and/or final approach			V			
245		Continued approach, when below DA(H) or MDA(H), after loss of visual references			V			
246		Late or inadequate response to MSAW warning			V			
247		Failure to go-around, when so required			V			
248		Failure to follow published missed-approach procedure			V			
249		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of MSAW system.			V			
250		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MSAW System			V			
251		Lack of adherence to the current technology standards in terms of flight safety and efficiency - engines location.		V				



	Safety Performance	Drawinsons		Ope	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
252		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. MSAW warning.			V			
253		Late activation of pedal braking or takeover from autobrake, when so required		V				V
254		Delayed selection of reverse thrust		V				V
255		Late thrust reduction or power-on touchdown		V				V
256		Failure to arm ground-spoilers		V				V
257		Inappropriate selection of autobrake mode for given runway length and condition		V				V
258		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum		V				٧
259		Lack of adherence to SOP in terms of necessary amount of fuel		V				V
260		Lack of adherence to AFM in terms of emergency procedures - engine failure		V				
261		Incorrect or confusing / misleading ATC instructions			V			
262		Flaws in aircraft system maintenance process definition - stickshaker			V			
263		Lack of adherence to SOP for approach and landing		V				
264		Flaws in aircraft system maintenance process definition - Electrical wiring System		V				
265		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS			٧			
266		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Electrical / wiring system components		V				
267		Flaws in manufacturer quality control process - Electrical / wiring systems components		V				
268		Flaws in aircraft system maintenance process definition - GPWS system components			V			
269		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - GPWS system components			V			
270		Flaws in manufacturer quality control process - GPWS system components			V			
131	Rate of level bust at low altitude/flight	Pilot tiredness - Inadequate workload distribution		V	V	V	٧	V
132		Flaws in pilot requirements definition process and/or training methodology		V	V	V	V	V
133		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology		V	V		V	٧
134		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution		V	V		٧	٧
135		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties		V	V	V		V
136		Lack of adherence to SOP in terms of approach and landing		V	V			٧
137		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.		V			V	



	Safety Performance	Dec sussession .		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
138		Incorrect use of automation - FMS		V	٧			V
139		Unintuitive and / or error prone system manual - FMS		٧	V		1	V
140		Flaws in CRM training procedures		V	V		 	V
141		Lack of adherence to the main CRM rules		V	V			V
142		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		٧			٧	V
143		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components		V			V	
144		Aggressive maneuvering / overcontrolling		٧			<u> </u>	V
145		Lack of adherence to the SOP in terms of critical indicators cross-checking		V	V		1	
146		Flaws in manufacturer quality control process - Engine systems and / or components		V			V	
147		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)		٧	٧	٧	٧	
148		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fuel system components		V				
149		Flaws in aircraft system maintenance process definition - Fuel system compoonents		V				
150		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)		V	V	V	V	
151		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)		V	V	V	V	
152		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring		V			V	
153		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		٧			V	
154		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.		٧	٧			٧
155		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components			V	V	V	
156		Flaws in manufacturer quality control process - Onboard navigational systems and components.			V	V	V	
157		Lack of or poor communication quality			V	V	V	
158		Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport in the case of adverse weather.		V				V
159		Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing		V			-	٧
160		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path		V				V
161		Inadequate aircraft de-icing / anti-icing		V	_		V	
162		Traffic controller tiredness - Inadequate workload distribution			V	V		



	Safety Performance	Data surrecure		Op	eration	al issu	e	 ,
No.	Indicators	Precursors	1	2	3	4	5	6
163		Flaws in traffic controller requirements definition process and/or training methodology			V	V		
164		Lack of English proficiency			V	V		
165		Use of non-standard phraseology by pilot and/or controller			V	V		
166		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver			V	V		
167		Altimeter setting error			V	V		
168		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.		٧			V	
169		Flaws in aircraft system maintenance process definition - Components of Wing control surface system.		٧			V	
170		Flaws in manufacturer quality control process - Components of Wing control surface system.		٧			V	
171		Lack of adherence to SOP in terms of AFM limitations		٧				
172		Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure		٧				V
173		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Integrity of primary aircraft structure.		٧				
174		Flaws in manufacturer quality control process - Integrity of primary aircraft structure.		٧				
175		Flaws in manufacturer quality control process - Fuel system components.		٧				
176		Lack of adherence to emergency procedures - control recovery		٧				٧
177		Lack of adherence to SARPs in terms of avoiding adverse weather conditions during flight		٧				
178		Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.		٧				
179		Flaws in manufacturer quality control process - Landing gear components.		٧				
180		Flaws in aircraft system maintenance process definition - Landing gear components.		٧				
181		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components		٧			V	
182		Flaws in aircraft system maintenance process definition - APU systems and / or components		V			V	
183		Flaws in aircraft system maintenance process definition - Engine systems and / or components		V			V	
184		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine anti-ice systems and / or components		٧				
185		Flaws in manufacturer quality control process - Engine anti-ice system and / or components		V				
186		Flaws in aircraft system maintenance process definition - Engine anti-ice system and / or components		٧				
187		Incorrect use of automation -Engine anti-ice system		V				
188		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Reduction gear in the engine		٧				



	Safety Performance	December 2		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
189		Flaws in manufacturer quality control process - Reduction gear in the engine.		٧			1	
190		Flaws in aircraft system maintenance process definition - Reduction gear in the engine.		V			-	
191		Inadequate de-icing method applied		V			1	
192		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Compressor in the engine		٧				
193		Flaws in manufacturer quality control process - Compressor in the engine.		٧				
194		Flaws in aircraft system maintenance process definition - Compressor in the engine.		V				
195		Flaws in manufacturer quality control process - Engine accessory drive components.		V			1	
196		Flaws in aircraft system maintenance process definition - Engine accessory drive components.		V			-	
197		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine accessory drive components.		٧				
198		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ECAM (or similar) system components.		V				
199		Lack of adherence to emergency procedures - Fuel starvation		٧				
200		Flaws in aircraft system maintenance process definition - Oil distribution system		V				
201		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Oil distribution system		٧				
202		Flaws in manufacturer quality control process - Oil distribution system		V			1	
203		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.			٧		٧	
204		Flaws in aircraft system maintenance process definition - ECAM (or similar) system components.		V			1	
205		Unintuitive and / or error prone system manual - Engine anti-icing system		V				
206		Lack of adherence to SOP in terms of de-icing / anti-icing procedures.		V			-	
207		Flaws in manufacturer quality control process - ECAM (or similar) system components.		V				
208		Flaws in manufacturer quality control process - Fire extinguishing system components		V		V	V	
209		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ECAM.		V			1	
210		Flaws in manufacturer quality control process - APU systems and / or components		٧				
211		Flaws in aircraft system maintenance process definition - Engine combustor		٧				
212		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine combustor		٧				
213		Flaws in manufacturer quality control process - Engine combustor		V				



	Safety Performance	P		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
214		Flaws in aircraft system maintenance process definition - Engine turbine components		V				
215		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine turbine components		٧				
216		Flaws in manufacturer quality control process - Engine turbine components		V				
217		Unintuitive and / or error prone system manual - CPCS					V	V
218		Failure to check navigation accuracy before approach			V			
219		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. Navigational aid failure.			V			
220		Not recognized ground Navaids System failure not reflected in NOTAM messages			V			
221		Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS)			V			
222		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS)			V			
223		Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS)			V			
224		Current airport diagram not reflecting critical changes			V			
225		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).			٧			
226		Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination			٧			
227		Lack of adherence to SOP for AIR operations in terms of controller error in approach clearence instruction			V			
228		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components		٧			٧	
229		Flaws in aircraft system maintenance process definition - Hydraulic System		٧			V	
230		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.				V	٧	
231		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.				٧	٧	
232		Flaws in manufacturer quality control process - Communication equipment systems and components.				V	V	
233		Navigation deviation				V	٧	
234		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components		V			٧	
235		Flaws in aircraft system maintenance process definition - Fire detection system components		V			V	
236		Flaws in manufacturer quality control process - Fire detection system components		V			٧	
237		Flaws in aircraft system maintenance process definition - Fire warning system		V			٧	
238		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance		V			V	



	Safety Performance	Draguesara		Ор	eration	al issu	e	-
No.	Indicators	Precursors	1	2	3	4	5	6
		with requirements - Fire warning system						
239		Flaws in manufacturer quality control process - Fire warning system		V			V	
240		Flaws in aircraft system maintenance process definition - Electrical wiring System		V				
241		Separation of structural element / component of the aircraft during take-off or landing		V				
242		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Electrical / wiring system components		V				
243		Flaws in manufacturer quality control process - Electrical / wiring systems components		V			l	
244		Lack of adherence to SOP in terms of fuelling procedure		V				
245		Inadequate maintenance of fire vulnerable aircraft parts or components		V				
246		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements in terms of fire resistance		٧				
247		Lack of adherence to regulations concerning transport of DGR goods		V				
248		Lack of adherence to engine limitations		V				
249		Intensified traffic related to general aviation activity e. g. over GA airport / airfield				V		
250		Incorrect or confusing / misleading ATC instructions				V		
251		Hearback ommitted				V		
252		Lack of adherence to SOP for take-off procedure in terms of altimeter callibration.				V		
253		Lack of adherence to Rules of the Air - adherence to Controller clearance				V		
254		Tactical or / and Planning Controller tiredness - Inadequate workload distribution				V		
255		Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology				V		
256		Unintuitive and / or error prone system manual - communication equipment.				V		
257		Altitude deviation				V		
258		Level bust (pilot lapse or late re-clearance by ATC)				V		
259		Failure to comply with an altitude or speed restriction / constraint				V		
260		Inadequate coordination between ATM centers and/or ATC sectors				V		
261		Flaws in Airspace and Air Traffic planning procedures design process				٧		
262		Flaws in conflict and separation minima infringement detection / elimination procedures				٧		
263		Lack of adherence of airlines to time contraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data.				V		
264		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance				V		



	Safety Performance	Dragingare		Ор	eration	al issu	<u> </u>	
No.	Indicators	Precursors	1	2	3	4	5	6
		with requirements - MTCD System						
265		Lack of adherence of airlines to declared Flight Plan.				٧		
266		Failure to identify the pre-tactical conflict before it reach the tactical controller				٧		
267		Lack of adherence to SOP for Airborne operation in terms of minimum seprataion				V		
268		Incorrect use of communication equipment				V		
269		Military activity in controlled airport or located within controlled area				V		
270		General aviation activity in controlled airport or located within controlled area				V		1
271		Deviation from flight trajectory commanded by controller				V		
272		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of fire detection / warning or / and extinguishing system.		٧				
273		Imbalanced and inaproppriate relation between cpt and his subordinates			V			
274		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components		V			V	
275		High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,)		٧				٧
276		Late deceleration and configuration set-up for approach and landing		V				V
277		Unstabilized final approach (high, fast, steep,)		V				V
278		Flaws in aircraft system maintenance process definition - Fire extinguishing system components		V			٧	1
279		Lack of adherence to AFM in terms of emergency procedures - engine restart procedure		V				
280		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					V	
281		Poor application of T/O & RTO procedure, failure recognition and preparedness					٧	
282		Lack of adherence to SOP in terms of awareness on supporting systems warning		٧				
283		Unintuitive and / or error prone system manual - ECAM		V				
284		Descent above desired descent profile		٧				٧
285		DME / ILS DME confusion in assessing the final descent point / FAF		V				٧
286		Flaws in manufacturer quality control process - Engine sensors		V				
287		Flaws in aircraft system maintenance process definition - Engine sensors		٧				
288		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine sensors		V				
289		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine		V			٧	



	Safety Performance	Dec courses		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
290		Flaws in manufacturer quality control process - Autothrottle system in the engine.		V			V	
291		Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.		V			V	
292		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of STCA System.				V		
293		Lack of adherence to regulations concerning independent ATCO monitoring				V		
294		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - STCA System				٧		
295		Lack of adherence to AFM in terms of emergency procedures - fire detection and extinguishing procedure		V				
296		Go-around attempt after thrust reversers deployment		V				٧
297		Lack of adherence to AFM limitations for landing		V				٧
298		Inadequate effectivenes of fire extinguishing system		٧				
299		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine fuel distribution system		V				
300		Flaws in manufacturer quality control process - Engine fuel distribution system		V				
301		Flaws in aircraft system maintenance process definition - Engine fuel distribution system		V				
302		Unintuitive and / or error prone system manual - fire extinguishing system		٧				
303		Lack of adherence to AFM limitations for Take-off		٧				
304		Lack of adherence to SOP in terms of AFM limitations in terms of weigh and balance		٧				
305		Lack of adherence to SOP in terms of load sheet preparation and verification		V				
306		Lack of adherence to the current technology standards in terms of flight safety and efficiency - fuel tank allocation.		V				
307		Lack of adherence to AFM in terms of emergency procedures - stall recovery		V			V	
308		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components					V	
309		Flaws in manufacturer quality control process - Power supply system components					V	
310		Poor application of T/O & RTO procedure, aircraft handling					V	
311		Lack of adherence to SOP in terms of pre-flight inspections - cargo securing quality		V				
312		Error in calculation of necessary amount of fuel		٧				٧
313		Tailwind component above limit						٧
314		Flight below maneuvering speeds		٧				
315		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum		V			V	٧



	Safety Performance	Para a surra a		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
316		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Rudder components.		٧				
317		Flaws in aircraft system maintenance process definition - Rudder components.		٧				
318		Flaws in manufacturer quality control process - Rudder components.		٧				
319		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Horizontal stabilizer components.		٧				
320		Flaws in aircraft system maintenance process definition - Horizontal stabilizer components.		٧				
321		Flaws in manufacturer quality control process - Horizontal stabilizer components.		٧				
322		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Thrust reverse system in the engine.		٧				
323		Flaws in manufacturer quality control process - Thrust reverse system in the engine.		٧				
324		Flaws in aircraft system maintenance process definition - Thrust reverse system in the engine.		٧				
325		Long / floating flare						٧
326		Poor application of T/O & RTO procedure, braking initiation sequence					٧	
327		Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain)			V			
328		Premature descent to DA(H) before G/S intercept or premature descent to MDA(H) before final-descent-point / FAF			V			
329		Premature descent below MDA(H) before reaching the visual-descent-point (VDP)			V			
330		Flight below desired flight path during initial and/or final approach			V			
331		Continued approach, when below DA(H) or MDA(H), after loss of visual references			V			
332		Late or inadequate response to MSAW warning			V			
333		Failure to go-around, when so required			V			
334		Failure to follow published missed-approach procedure			V			
335		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of MSAW system.			V			
336		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MSAW System			٧			
337		Lack of adherence to the current technology standards in terms of flight safety and efficiency - engines location.		٧				
338		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. MSAW warning.			V			
339		Late activation of pedal braking or takeover from autobrake, when so required		٧				٧
340		Delayed selection of reverse thrust		٧				٧
341		Late thrust reduction or power-on touchdown		٧				٧



	Safety Performance	Draginague		Operational issue 2 3 4 5 V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V							
No.	Indicators	Precursors	1	2	3	4	5	6			
342		Failure to arm ground-spoilers		٧				٧			
343		Inappropriate selection of autobrake mode for given runway length and condition		V				٧			
344		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment					V				
345		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.					V				
346		Lack of adherence to SOP in terms of necessary amount of fuel		V				V			
347		Poor application of T/O & RTO procedure, computation of T/O parameters					V				
348		Lack of adherence to emergency procedures - recovery from severe FCS failure		V							
349		Lack of adherence to AFM in terms of emergency procedures - engine failure		V							
350		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ACAS system components				٧					
351		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS			V						
352		Inappropriate visual avoidance maneuver				V					
353		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ACAS installed on aircraft.				V					
354		Late or inadequate response to ACAS warning				V					
355		Flaws in aircraft system maintenance process definition - GPWS system components			V						
356		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - GPWS system components			V						
357		Flaws in manufacturer quality control process - GPWS system components			V						
131	Rate of separation minima infringements (ROC>7)/flight	Pilot tiredness - Inadequate workload distribution	V	V		V	V	V			
132		Flaws in pilot requirements definition process and/or training methodology	٧	V		٧	V	٧			
133		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	٧	V		V	٧	V			
134		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	٧	V		٧	V	٧			
135		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	V	٧		V	٧	٧			
136		Traffic controller tiredness - Inadequate workload distribution	٧	٧		٧	٧				
137		Flaws in traffic controller requirements definition process and/or training methodology	٧	V		V	٧				
138		Aggressive maneuvering / overcontrolling		V				V			
139		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.		V			V				



	Safety Performance	Pro sussesses		Op	Operational issue 2 3 4 5 V V V V V V V V V V V V V V V V V V V V V V V V V V V							
No.	Indicators	Precursors	1	2	3	4	5	6				
140		Lack of English proficiency	V	V		V	V					
141		Lack of or poor communication quality	V			٧	V					
142		Incorrect or confusing / misleading ATC instructions	V	V		V	V					
143		Use of non-standard phraseology by pilot and/or controller	V	V		V	٧					
144		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fuel system components		V								
145		Flaws in aircraft system maintenance process definition - Fuel system compoonents		V								
146		Flaws in CRM training procedures		V			V	V				
147		Lack of adherence to the main CRM rules		V			V	V				
148		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	V			V	V					
149		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components		V								
150		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		٧			٧	٧				
151		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path		V				V				
152		Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport in the case of adverse weather.		V				V				
153		Incorrect use of automation - FMS		٧				V				
154		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Integrity of primary aircraft structure.		V								
155		Flaws in manufacturer quality control process - Integrity of primary aircraft structure.		V			l					
156		Unintuitive and / or error prone system manual - FMS		V				V				
157		Lack of adherence to SOP in terms of approach and landing		V				V				
158		Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.		V								
159		Flaws in manufacturer quality control process - Engine systems and / or components		V								
160		Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing		V				V				
161		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.		V				V				
162		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring		٧			V					
163		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		٧			V					
164		Inadequate aircraft de-icing / anti-icing		V			٧					



	Safety Performance	Discourage		Op	eration	al issu	е	
No.	Indicators	Precursors	1	2	3	4	5	6
165		Lack of adherence to SARPs in terms of avoiding adverse weather conditions during flight		V				
166		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.		V			V	
167		Flaws in aircraft system maintenance process definition - Components of Wing control surface system.		V			٧	
168		Flaws in manufacturer quality control process - Components of Wing control surface system.		V			٧	
169		Lack of adherence to the SOP in terms of critical indicators cross-checking		V				
170		Lack of adherence to SOP in terms of AFM limitations		V				
171		Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure		V				V
172		Flaws in manufacturer quality control process - Fuel system components.		V				
173		Lack of adherence to emergency procedures - control recovery		V				V
174		Flaws in manufacturer quality control process - Landing gear components.		٧				
175		Flaws in aircraft system maintenance process definition - Landing gear components.		V				
176		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components		V			V	
177		Flaws in aircraft system maintenance process definition - APU systems and / or components		V			٧	
178		Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.	V				٧	
179		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine anti-ice systems and / or components		V				
180		Flaws in manufacturer quality control process - Engine anti-ice system and / or components		V				
181		Flaws in aircraft system maintenance process definition - Engine anti-ice system and / or components		V				
182		Lack of adherence to SOP for GND movements.	V	V				
183		Hearback ommitted	V			V		
184		Incorrect use of automation -Engine anti-ice system		V				
185		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Reduction gear in the engine		V				
186		Flaws in manufacturer quality control process - Reduction gear in the engine.		V				
187		Flaws in aircraft system maintenance process definition - Reduction gear in the engine.		V				
188		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence	V				V	
189		Inadequate de-icing method applied		V				
190		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Compressor in the engine		V				



	Safety Performance	D		Ор	V				
No.	Indicators	Precursors	1	2	3	4	5	6	
191		Flaws in manufacturer quality control process - Compressor in the engine.		V					
192		Flaws in aircraft system maintenance process definition - Compressor in the engine.		٧					
193		Flaws in manufacturer quality control process - Engine accessory drive components.		٧					
194		Flaws in aircraft system maintenance process definition - Engine accessory drive components.		V					
195		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine accessory drive components.		٧					
196		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ECAM (or similar) system components.		V					
197		Lack of adherence to Rules of the Air - adherence to Controller clearance				V	V		
198		Lack of adherence to emergency procedures - Fuel starvation		V					
199		Flaws in aircraft system maintenance process definition - Oil distribution system		V					
200		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Oil distribution system		٧					
201		Flaws in manufacturer quality control process - Oil distribution system		V					
202		Flaws in aircraft system maintenance process definition - ECAM (or similar) system components.		V					
203		Unintuitive and / or error prone system manual - Engine anti-icing system		٧					
204		Lack of adherence to SOP in terms of de-icing / anti-icing procedures.		٧					
205		Flaws in manufacturer quality control process - ECAM (or similar) system components.		٧					
206		Flaws in manufacturer quality control process - Fire extinguishing system components		V		٧	٧		
207		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ECAM.		V					
208		Flaws in Airspace and Air Traffic planning procedures design process				V	V		
209		Flaws in manufacturer quality control process - APU systems and / or components		V					
210		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity	V				V		
211		Flaws in aircraft system maintenance process definition - Engine combustor		V					
212		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine combustor		V					
213		Flaws in manufacturer quality control process - Engine combustor		٧			 L		
214		Flaws in aircraft system maintenance process definition - Engine turbine components		٧					
215		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine turbine components		٧					



	Safety Performance	Descriptions	T	Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
216		Flaws in manufacturer quality control process - Engine turbine components		V			1	
217		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)		V		٧	٧	
218		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)		V		V	V	
219		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)		V		V	V	
220		Inadvertent deviation from cleared taxi route	٧					
221		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.				V	V	
222		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.				V	٧	
223		Flaws in manufacturer quality control process - Communication equipment systems and components.				٧	V	
224		Tactical or / and Planning Controller tiredness - Inadequate workload distribution				V		
225		Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology				V	1	
226		Navigation deviation				V	V	
227		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components		V			٧	
228		Flaws in aircraft system maintenance process definition - Hydraulic System		V			V	
229		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components				V	V	
230		Flaws in manufacturer quality control process - Onboard navigational systems and components.				V	V	
231		Current airport diagram not reflecting critical changes	٧				1	
232		Takeoff without clearance	٧				٧	
233		Landing without clearance	٧				V	
234		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components		٧			٧	
235		Inadequate coordination between ATM centers and/or ATC sectors				٧	1	
236		Flaws in aircraft system maintenance process definition - Fire detection system components		V			V	
237		Flaws in manufacturer quality control process - Fire detection system components		V			V	
238		Flaws in aircraft system maintenance process definition - Fire warning system		V			V	
239		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system		V			٧	
240		Flaws in manufacturer quality control process - Fire warning system		V			٧	
241		Unintuitive and / or error prone system manual - CPCS		V			V	٧



	Safety Performance	Ducasiyaaya		Op	eration	al issue	2	
No.	Indicators	Precursors	1	2	3	4	5	6
242		Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	٧				V	
243		Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	V				V	
244		Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications	٧				٧	
245		Flaws in aircraft system maintenance process definition - Electrical wiring System		V				
246		Unintuitive and / or error prone system manual - communication equipment.				V		
247		Altitude deviation				V		
248		Level bust (pilot lapse or late re-clearance by ATC)				V		
249		Flaws in conflict and separation minima infringement detection / elimination procedures				V		
250		Lack of adherence of airlines to time contraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data.				V		
251		Incorrect use of communication equipment				V		
252		Separation of structural element / component of the aircraft during take-off or landing		V				1
253		Flaws in aircraft system maintenance process definition - Engine systems and / or components		V				
254		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Electrical / wiring system components		٧				
255		Flaws in manufacturer quality control process - Electrical / wiring systems components		V				
256		Lack of adherence to SOP in terms of fuelling procedure		V				
257		Failure to comply with an altitude or speed restriction / constraint				V		
258		Deviation from flight trajectory commanded by controller				V		
259		Inadequate maintenance of fire vulnerable aircraft parts or components		V				
260		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements in terms of fire resistance		٧				
261		Lack of adherence to regulations concerning transport of DGR goods		V				
262		Lack of adherence to engine limitations		V				
263		Altimeter setting error				V		
264		Lack of adherence to SOP for take-off procedure in terms of altimeter callibration.				V		
265		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MTCD System				V		
266		Lack of adherence of airlines to declared Flight Plan.				V		
267		Failure to identify the pre-tactical conflict before it reach the tactical controller				V		



	Safety Performance	Drawware		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
268		Lack of adherence to SOP for Airborne operation in terms of minimum seprataion				٧		
269		Military activity in controlled airport or located within controlled area				V		
270		General aviation activity in controlled airport or located within controlled area				٧		
271		Intensified traffic related to general aviation activity e. g. over GA airport / airfield				٧		
272		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of fire detection / warning or / and extinguishing system.		V				
273		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components		V			V	
274		Flaws in aircraft system maintenance process definition - Fire extinguishing system components		V			V	
275		Callsign confusion	V					
276		Lack of adherence to SOP in terms of ATCO and approach or ground controller communication	V					
277		Unintuitive and / or error prone system manual - ground radar.	V					
278		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground Radar	٧					
279		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ground radar at the airport.	٧					
280		Lack of adherence to SOP in terms of awareness on supporting systems (warning) - ground radar.	V					
281		Lack of adherence to AFM in terms of emergency procedures - engine restart procedure		٧				
282		Lack of adherence to SOP in terms of awareness on supporting systems warning		V				
283		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment	٧					
284		Unintuitive and / or error prone system manual - ECAM		V				
285		Descent above desired descent profile		V				V
286		High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,)		V				٧
287		Late deceleration and configuration set-up for approach and landing		V				V
288		DME / ILS DME confusion in assessing the final descent point / FAF		V				V
289		Unstabilized final approach (high, fast, steep,)		V				V
290		Flaws in manufacturer quality control process - Engine sensors		V				
291		Flaws in aircraft system maintenance process definition - Engine sensors		٧				
292		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine sensors		V				



	Safety Performance	Discourage		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
293		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of STCA System.				V		
294		Lack of adherence to regulations concerning independent ATCO monitoring				V		
295		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - STCA System				٧		
296		Lack of adherence to AFM in terms of emergency procedures - fire detection and extinguishing procedure		V				
297		Lack of adherence to SOP for GND movements. Poor execution of parking / docking /pushback procedure	V					
298		Go-around attempt after thrust reversers deployment		V				V
299		Lack of adherence to AFM limitations for landing		V				V
300		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine		٧			٧	
301		Flaws in manufacturer quality control process - Autothrottle system in the engine.		V			V	
302		Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.		V			V	
303		Lack of adherence to emergency procedures - RWY collision avoidance	V					
304		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake)	٧					
305		Inadequate effectivenes of fire extinguishing system		V				
306		Unintuitive and / or error prone system manual - fire extinguishing system		V				
307		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					V	
308		Lack of adherence to SOP in terms of requested information support for other aircraft in terms of adverse weather conditions		V				
309		Lack of adherence to SOP in terms of application of findings from weather report		V				
310		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.				V	٧	
311		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components					٧	
312		Incorrect weather report obtained by the flight crew		V				
313		Lack of adherence to SOP in terms of providing flight crew with current weather report		V				
314		Flaws in manufacturer quality control process - Power supply system components					٧	
315		Flaws in airport capacity management process					٧	
316		Unintuitive and / or error prone system manual - On-board weather radar.		V				
317		Incorrect use of automation - On-board weather radar		V				



	Safety Performance	Discourses		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
318		Lack of adherence to SOP for take-off procedure in terms of time limitation for take-off preparation.					٧	
319		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - On-board weather radar		V				
320		Flaws in manufacturer quality control process - On-board weather radar		V				
321		Flaws in aircraft system maintenance process definition - On-board weather radar		V				
322		Lack of adherence of passengers to the recommendation: Fasten seat belt while seated		V				
323		Lack of adherence to SOP in terms of "fasten your seat belt" information activation in passenger cabin during flight in turbulence conditions		V				
324		Inadequate airline / regulatory provider policy in terms of aware of the risks related to air travel		V				
325		Lack of adherence to SOP in terms of awareness on supporting systems (warning) - RIMCAS.	٧					
326		Error in calculation of necessary amount of fuel		V				٧
327		Late rejected takeoff decision / initiation					V	
328		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components		٧				
329		Flaws in aircraft system maintenance process definition - Aircraft door system and / or components		V				
330		Flaws in manufacturer quality control process - CPCS system and / or components		٧				
331		Flaws in aircraft system maintenance process definition - CPCS system and / or components		V				
332		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - CPCS system and / or components		٧				
333		Lack of adherence to ICAO Annex 14 and related documents in terms of airside lights distribution	V					
334		Lack of adherence to ICAO Annex 14 and related documents in terms of nonrestricted view on airsite from TWR	٧					
335		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of Runway Conflict Warning System.	V					
336		Flight below maneuvering speeds		V				
337		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum		V			V	٧
338		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - RCWS	V					
339		Poor application of T/O & RTO procedure, failure recognition and preparedness					V	
340		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Rudder components.		٧				
341		Flaws in aircraft system maintenance process definition - Rudder components.		V				ĺ



	Safety Performance	Precursors		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
342		Flaws in manufacturer quality control process - Rudder components.	ļ	V				
343		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Horizontal stabilizer components.		٧				
344		Flaws in aircraft system maintenance process definition - Horizontal stabilizer components.		V				
345		Flaws in manufacturer quality control process - Horizontal stabilizer components.		V				
346		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Thrust reverse system in the engine.		٧				
347		Flaws in manufacturer quality control process - Thrust reverse system in the engine.		V				
348		Flaws in aircraft system maintenance process definition - Thrust reverse system in the engine.		V				
349		Lack of adherence to emergency procedures - flight deck smoke procedure		V				
350		Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations					V	
351		Lack of adherence to the SOP in terms of critical maneuvre execution - flare		V				
352		Extreme operation condition / poor maintenance quality / advanced life lenght		V				
353		Incorrect use of automation - CPCS		٧				
354		Lack of adherence to the current technology standards in terms of flight safety and efficiency - engines location.		V				
355		Late activation of pedal braking or takeover from autobrake, when so required		٧				V
356		Delayed selection of reverse thrust		V				V
357		Late thrust reduction or power-on touchdown		V				V
358		Failure to arm ground-spoilers		V				V
359		Inappropriate selection of autobrake mode for given runway length and condition		V				V
360		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment					٧	
361		Poor application of T/O & RTO procedure, braking initiation sequence					٧	
362		Lack of adherence to AFM limitations for Take-off		V				
363		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.					V	
364		Lack of adherence to SOP in terms of necessary amount of fuel		V				V
365		Poor application of T/O & RTO procedure, computation of T/O parameters					٧	
366		Lack of adherence to emergency procedures - recovery from severe FCS failure		٧				
367		Lack of adherence to AFM in terms of emergency procedures - engine failure		٧				
368		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine fuel distribution system		٧				



	Safety Performance	Draguyaaya		Operational issue 1 2 3 4 5							
No.	Indicators	Precursors	1	2	3	4	5	6			
369		Flaws in manufacturer quality control process - Engine fuel distribution system		V							
370		Flaws in aircraft system maintenance process definition - Engine fuel distribution system		V							
371		Inadequate stall recovery procedure for the aircraft	٧								
372		Inadequate management / separation of takeoffs and landings	٧								
373		Lack of adherence to SOP for approach and landing		V							
374		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ACAS system components				V					
375		Inappropriate visual avoidance maneuver				V					
376		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ADI system components				٧					
377		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ACAS installed on aircraft.				V					
378		Late or inadequate response to ACAS warning				V					
131	Rate of airspace infringements/flight	Pilot tiredness - Inadequate workload distribution		V	٧	٧	٧	V			
132		Flaws in pilot requirements definition process and/or training methodology		V	٧	V	V	V			
133		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology		V	V	V	V	V			
134		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution		V	V	V	V	V			
135		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties		٧	٧	٧	٧	V			
136		Flaws in CRM training procedures		V	V		V	V			
137		Lack of adherence to the main CRM rules		V	V		V	V			
138		Lack of adherence to SOP in terms of approach and landing		V	V			V			
139		Incorrect use of automation - FMS		V	٧			V			
140		Unintuitive and / or error prone system manual - FMS		V	٧			V			
141		Traffic controller tiredness - Inadequate workload distribution		V	V	V	٧				
142		Flaws in traffic controller requirements definition process and/or training methodology		V	٧	V	٧				
143		Lack of adherence to the SOP in terms of critical indicators cross-checking		٧	٧						
144		Aggressive maneuvering / overcontrolling		V				٧			
145		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.		٧			V				
146		Lack of or poor communication quality			V	V	V				



	Safety Performance	Drocursors		Operational issue 1 2 3 4 5							
No.	Indicators	Precursors	1	2	3	4	5	6			
147		Lack of English proficiency	ļ	V	V	V	V				
148		Use of non-standard phraseology by pilot and/or controller		V	V	٧	V				
149		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver			V	V	V				
150		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fuel system components		٧							
151		Flaws in aircraft system maintenance process definition - Fuel system compoonents		V							
152		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components		٧							
153		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)			V	V	V				
154		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		٧			٧	V			
155		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components			V	V	V				
156		Flaws in manufacturer quality control process - Onboard navigational systems and components.			V	٧	V				
157		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.		٧	V			٧			
158		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path		٧				٧			
159		Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport in the case of adverse weather.		٧				٧			
160		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)			V	٧	V				
161		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)			V	V	V				
162		Flaws in manufacturer quality control process - Engine systems and / or components		٧							
163		Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing		٧				V			
164		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring		٧			V				
165		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		V			V				
166		Inadequate aircraft de-icing / anti-icing		V			V				
167		Altimeter setting error			V	V					
168		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Integrity of primary aircraft structure.		V							
169		Flaws in manufacturer quality control process - Integrity of primary aircraft structure.		٧	1						
170		Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.		V							



	Safety Performance	Due course		Op	eration			
No.	Indicators	Precursors	1	2	3	4	5	6
171		Lack of adherence to SOP in terms of AFM limitations		V				
172		Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure		V				٧
173		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.		V			٧	
174		Flaws in aircraft system maintenance process definition - Components of Wing control surface system.		V			V	
175		Flaws in manufacturer quality control process - Components of Wing control surface system.		V			V	
176		Flaws in manufacturer quality control process - Fuel system components.		V				
177		Lack of adherence to SARPs in terms of avoiding adverse weather conditions during flight		٧				
178		Flaws in manufacturer quality control process - Landing gear components.		٧				
179		Flaws in aircraft system maintenance process definition - Landing gear components.		V				
180		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components		V			V	
181		Flaws in aircraft system maintenance process definition - APU systems and / or components		V			٧	
182		Lack of adherence to emergency procedures - control recovery		V				V
183		Incorrect or confusing / misleading ATC instructions		V	V	V	V	
184		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine anti-ice systems and / or components		٧				
185		Flaws in manufacturer quality control process - Engine anti-ice system and / or components		V				
186		Flaws in aircraft system maintenance process definition - Engine anti-ice system and / or components		٧				
187		Incorrect use of automation -Engine anti-ice system		٧				
188		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Reduction gear in the engine		٧				
189		Flaws in manufacturer quality control process - Reduction gear in the engine.		V				
190		Flaws in aircraft system maintenance process definition - Reduction gear in the engine.		V				
191		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.			V	V	٧	
192		Inadequate de-icing method applied		V				
193		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Compressor in the engine		٧				
194		Flaws in manufacturer quality control process - Compressor in the engine.		V				
195		Flaws in aircraft system maintenance process definition - Compressor in the engine.		V				



	Safety Performance	Descriptions		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
196		Flaws in manufacturer quality control process - Engine accessory drive components.		٧				
197		Flaws in aircraft system maintenance process definition - Engine accessory drive components.		V				
198		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine accessory drive components.		V				
199		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ECAM (or similar) system components.		V				
200		Lack of adherence to emergency procedures - Fuel starvation		٧			<u> </u>	
201		Flaws in aircraft system maintenance process definition - Oil distribution system		V			1	
202		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Oil distribution system		V				
203		Flaws in manufacturer quality control process - Oil distribution system		٧			<u> </u>	
204		Flaws in aircraft system maintenance process definition - ECAM (or similar) system components.		V			1	
205		Unintuitive and / or error prone system manual - Engine anti-icing system		V				
206		Lack of adherence to SOP in terms of de-icing / anti-icing procedures.		V				
207		Flaws in manufacturer quality control process - ECAM (or similar) system components.		٧			1	
208		Flaws in manufacturer quality control process - Fire extinguishing system components		V		V	V	
209		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ECAM.		٧				
210		Flaws in manufacturer quality control process - APU systems and / or components		٧				
211		Flaws in aircraft system maintenance process definition - Engine combustor		٧			1	
212		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine combustor		٧				
213		Flaws in manufacturer quality control process - Engine combustor		V			l	
214		Flaws in aircraft system maintenance process definition - Engine turbine components		V			1	
215		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine turbine components		٧				
216		Flaws in manufacturer quality control process - Engine turbine components		V				
217		Lack of adherence to Rules of the Air - adherence to Controller clearance				V	٧	
218		Failure to check navigation accuracy before approach			٧			
219		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS)			٧			
220		Current airport diagram not reflecting critical changes			٧			



	Safety Performance	Dragiusaire		Operational issue 1						
No.	Indicators	Precursors	1	2	3	4	5	6		
221		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. Navigational aid failure.			V		1			
222		Not recognized ground Navaids System failure not reflected in NOTAM messages			V					
223		Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS)			V		- 			
224		Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS)			V		- 			
225		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).			V					
226		Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination			V					
227		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.				٧	V			
228		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.				V	٧			
229		Flaws in manufacturer quality control process - Communication equipment systems and components.				V	V			
230		Lack of adherence to SOP for AIR operations in terms of controller error in approach clearence instruction			V					
231		Navigation deviation				V	٧			
232		Flaws in Airspace and Air Traffic planning procedures design process				V	V			
233		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components		٧			٧			
234		Flaws in aircraft system maintenance process definition - Hydraulic System		٧			V			
235		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components		٧			٧			
236		Flaws in aircraft system maintenance process definition - Fire detection system components		V			V			
237		Flaws in manufacturer quality control process - Fire detection system components		٧			V			
238		Flaws in aircraft system maintenance process definition - Fire warning system		٧			V			
239		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system		٧			٧			
240		Flaws in manufacturer quality control process - Fire warning system		V			V			
241		Hearback ommitted				٧				
242		Unintuitive and / or error prone system manual - CPCS		٧			٧	٧		
243		Flaws in aircraft system maintenance process definition - Electrical wiring System		V						
244		Unintuitive and / or error prone system manual - communication equipment.				V				
245		Altitude deviation				V				



	Safety Performance	Discourse and the state of the		Op	eration			
No.	Indicators	Precursors	1	2	3	4	5	6
246		Level bust (pilot lapse or late re-clearance by ATC)				V		
247		Incorrect use of communication equipment				V		
248		Separation of structural element / component of the aircraft during take-off or landing		٧				
249		Flaws in aircraft system maintenance process definition - Engine systems and / or components		٧				
250		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Electrical / wiring system components		٧				
251		Flaws in manufacturer quality control process - Electrical / wiring systems components		V				
252		Lack of adherence to SOP in terms of fuelling procedure		٧				
253		Failure to comply with an altitude or speed restriction / constraint				V		
254		Deviation from flight trajectory commanded by controller				V		
255		Inadequate maintenance of fire vulnerable aircraft parts or components		V				
256		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements in terms of fire resistance		٧				
257		Lack of adherence to regulations concerning transport of DGR goods		V				
258		Lack of adherence to engine limitations		V				
259		Lack of adherence to SOP for take-off procedure in terms of altimeter callibration.				V		
260		Flaws in conflict and separation minima infringement detection / elimination procedures				V		
261		Military activity in controlled airport or located within controlled area				V		
262		General aviation activity in controlled airport or located within controlled area				V		
263		Intensified traffic related to general aviation activity e. g. over GA airport / airfield				V		
264		Tactical or / and Planning Controller tiredness - Inadequate workload distribution				V		
265		Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology				V		
266		Inadequate coordination between ATM centers and/or ATC sectors				V		
267		Lack of adherence of airlines to time contraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data.				٧		
268		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MTCD System				V		
269		Lack of adherence of airlines to declared Flight Plan.				V		
270		Failure to identify the pre-tactical conflict before it reach the tactical controller				٧		
271		Lack of adherence to SOP for Airborne operation in terms of minimum seprataion				V		



	Safety Performance	December		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
272		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of fire detection / warning or / and extinguishing system.		٧				
273		Imbalanced and inaproppriate relation between cpt and his subordinates			V			
274		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components		٧			٧	
275		Flaws in aircraft system maintenance process definition - Fire extinguishing system components		V			V	
276		Lack of adherence to AFM in terms of emergency procedures - engine restart procedure		٧				
277		Lack of adherence to SOP in terms of awareness on supporting systems warning		٧			- 	
278		Unintuitive and / or error prone system manual - ECAM		V				
279		Descent above desired descent profile		٧			 	٧
280		High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,)		V				V
281		Late deceleration and configuration set-up for approach and landing		٧			1	٧
282		DME / ILS DME confusion in assessing the final descent point / FAF		٧				٧
283		Unstabilized final approach (high, fast, steep,)		٧				٧
284		Flaws in manufacturer quality control process - Engine sensors		٧			- 	
285		Flaws in aircraft system maintenance process definition - Engine sensors		٧				
286		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine sensors		٧				
287		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of STCA System.				V		
288		Lack of adherence to regulations concerning independent ATCO monitoring				V		
289		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - STCA System				V		
290		Lack of adherence to AFM in terms of emergency procedures - fire detection and extinguishing procedure		V				
291		Go-around attempt after thrust reversers deployment		٧				٧
292		Lack of adherence to AFM limitations for landing		٧			- 	٧
293		Inadequate effectivenes of fire extinguishing system		٧				
294		Unintuitive and / or error prone system manual - fire extinguishing system		٧				
295		Landing without clearance					V	
296		Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings					٧	
297		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					V	



	Safety Performance	Draginague		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
298		Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots					V	
299		Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.					V	
300		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components					V	
301		Flaws in manufacturer quality control process - Power supply system components					V	
302		Flaws in airport capacity management process					V	
303		Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications					V	
304		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence					V	
305		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity					V	
306		Takeoff without clearance					V	
307		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine					V	
308		Flaws in manufacturer quality control process - Autothrottle system in the engine.					V	
309		Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.					V	
310		Lack of adherence to SOP for take-off procedure in terms of time limitation for take-off preparation.					V	
311		Error in calculation of necessary amount of fuel		V				V
312		Late rejected takeoff decision / initiation					V	
313		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components		٧				
314		Flaws in aircraft system maintenance process definition - Aircraft door system and / or components		V				
315		Flaws in manufacturer quality control process - CPCS system and / or components		V				
316		Flaws in aircraft system maintenance process definition - CPCS system and / or components		V				
317		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - CPCS system and / or components		V				
318		Lack of adherence to SOP for GND movements.		V				
319		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum		٧			V	٧
320		Poor application of T/O & RTO procedure, failure recognition and preparedness					V	
321		Lack of adherence to emergency procedures - flight deck smoke procedure		٧				
322		Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations					V	



	Safety Performance	Discourage		Ор	eration	al issu	<u> </u>	
No.	Indicators	Precursors	1	2	3	4	5	6
323		Lack of adherence to the SOP in terms of critical maneuvre execution - flare		٧				
324		Extreme operation condition / poor maintenance quality / advanced life lenght		٧				
325		Incorrect use of automation - CPCS		V				
326		Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain)			V			
327		Premature descent to DA(H) before G/S intercept or premature descent to MDA(H) before final-descent-point / FAF			V			
328		Premature descent below MDA(H) before reaching the visual-descent-point (VDP)			V			
329		Flight below desired flight path during initial and/or final approach			V			
330		Continued approach, when below DA(H) or MDA(H), after loss of visual references			٧			
331		Late or inadequate response to MSAW warning			٧			
332		Failure to go-around, when so required			٧			
333		Failure to follow published missed-approach procedure			٧			
334		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of MSAW system.			V			
335		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MSAW System			٧			
336		Lack of adherence to the current technology standards in terms of flight safety and efficiency - engines location.		٧				
337		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. MSAW warning.			V			
338		Late activation of pedal braking or takeover from autobrake, when so required		V				٧
339		Delayed selection of reverse thrust		٧				٧
340		Late thrust reduction or power-on touchdown		V				٧
341		Failure to arm ground-spoilers		٧				٧
342		Inappropriate selection of autobrake mode for given runway length and condition		٧				٧
343		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment					V	
344		Poor application of T/O & RTO procedure, braking initiation sequence					V	
345		Lack of adherence to AFM limitations for Take-off		V				
346		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.					V	
347		Lack of adherence to SOP in terms of necessary amount of fuel		٧				٧
348		Poor application of T/O & RTO procedure, computation of T/O parameters					٧	
349		Lack of adherence to AFM in terms of emergency procedures - engine failure		V				
350		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance		V				



	Safety Performance	Ducasinos		Ор	Operational issue 2 3 4 5 V V V V V V V V V V V V							
No.	Indicators	Precursors	1	2	3	4	5	6				
		with requirements - Engine fuel distribution system										
351		Flaws in manufacturer quality control process - Engine fuel distribution system		V								
352		Flaws in aircraft system maintenance process definition - Engine fuel distribution system		V								
353		Lack of adherence to SOP for approach and landing		٧								
354		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ACAS system components				٧						
355		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS			V			<u> </u>				
356		Inappropriate visual avoidance maneuver				V						
357		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ADI system components				V						
358		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ACAS installed on aircraft.				V						
359		Late or inadequate response to ACAS warning				V		<u>L</u>				
360		Flaws in aircraft system maintenance process definition - GPWS system components			V							
361		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - GPWS system components			V							
362		Flaws in manufacturer quality control process - GPWS system components			V							
131	Rate of level busts/flight	Pilot tiredness - Inadequate workload distribution		V	V	V	V	V				
132		Flaws in pilot requirements definition process and/or training methodology		V	V	V	٧	٧				
133		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology		V	V	V	V	V				
134		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution		٧	V	V	٧	V				
135		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties		٧	V	V		٧				
136		Lack of adherence to the SOP in terms of critical indicators cross-checking		٧	V							
137		Lack of adherence to SOP in terms of approach and landing		٧	V			V				
138		Incorrect use of automation - FMS		V	V			V				
139		Unintuitive and / or error prone system manual - FMS		V	V			V				
140		Flaws in CRM training procedures		٧	V			٧				
141		Lack of adherence to the main CRM rules		٧	V			V				
142		Traffic controller tiredness - Inadequate workload distribution		٧	V	V						
143		Flaws in traffic controller requirements definition process and/or training methodology		V	V	V						



	Safety Performance	Descriptions		Op	eration	al issu	<u></u>	
No.	Indicators	Precursors	1	2	3	4	5	6
144		Aggressive maneuvering / overcontrolling		V				V
145		Inadequate aircraft de-icing / anti-icing		V			V	
146		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.		٧			٧	
147		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)		V	>	٧	V	
148		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fuel system components		V				
149		Flaws in aircraft system maintenance process definition - Fuel system compoonents		٧				
150		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)		V	V	V	V	
151		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)		V	V	V	V	
152		Lack of or poor communication quality			V	V	V	
153		Lack of English proficiency		V	V	V		
154		Use of non-standard phraseology by pilot and/or controller		V	V	V		
155		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components		٧				
156		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components			V	V	V	
157		Flaws in manufacturer quality control process - Onboard navigational systems and components.			V	V	V	
158		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		٧			٧	V
159		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver			V	V		
160		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.		٧	٧			٧
161		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Integrity of primary aircraft structure.		V				
162		Flaws in manufacturer quality control process - Integrity of primary aircraft structure.		V			l	
163		Lack of adherence to SOP in terms of de-icing / anti-icing procedures.		V				
164		Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather.		٧				V
165		Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.		٧			 L	
166		Flaws in manufacturer quality control process - Engine systems and / or components		V				
167		Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing		٧				٧
168		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent		V				V



	Safety Performance	Discourage	1	Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
		path						
169		Lack of adherence to SARPs in terms of avoiding adverse weather conditions during flight		V				
170		Altimeter setting error			V	V		
171		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.		٧			٧	
172		Flaws in aircraft system maintenance process definition - Components of Wing control surface system.		V			٧	
173		Flaws in manufacturer quality control process - Components of Wing control surface system.		V			٧	
174		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring		٧				
175		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		٧				
176		Lack of adherence to SOP in terms of AFM limitations		V				
177		Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure		V				V
178		Flaws in manufacturer quality control process - Fuel system components.		V				
179		Lack of adherence to emergency procedures - control recovery		V				V
180		Flaws in manufacturer quality control process - Landing gear components.		V				
181		Flaws in aircraft system maintenance process definition - Landing gear components.		V				
182		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components		V			V	
183		Flaws in aircraft system maintenance process definition - APU systems and / or components		V			V	
184		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine anti-ice systems and / or components		٧				
185		Flaws in manufacturer quality control process - Engine anti-ice system and / or components		V				
186		Flaws in aircraft system maintenance process definition - Engine anti-ice system and / or components		٧				
187		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.			٧	٧	٧	
188		Incorrect use of automation -Engine anti-ice system		V				
189		Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination		٧	٧			
190		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Reduction gear in the engine		V				
191		Flaws in manufacturer quality control process - Reduction gear in the engine.		٧				
192		Flaws in aircraft system maintenance process definition - Reduction gear in the engine.		V				



	Safety Performance	Dec courses		Op	eration	e		
No.	Indicators	Precursors	1	2	3	4	5	6
193		Inadequate de-icing method applied		٧				
194		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Compressor in the engine		V				
195		Flaws in manufacturer quality control process - Compressor in the engine.		٧				
196		Flaws in aircraft system maintenance process definition - Compressor in the engine.		٧				
197		Flaws in manufacturer quality control process - Engine accessory drive components.		V				
198		Flaws in aircraft system maintenance process definition - Engine accessory drive components.		٧				
199		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine accessory drive components.		V				
200		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ECAM (or similar) system components.		V				
201		Lack of adherence to emergency procedures - Fuel starvation		V				<u> </u>
202		Flaws in aircraft system maintenance process definition - Oil distribution system		٧				<u> </u>
203		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Oil distribution system		V				
204		Flaws in manufacturer quality control process - Oil distribution system		V				'
205		Flaws in aircraft system maintenance process definition - ECAM (or similar) system components.		٧				
206		Unintuitive and / or error prone system manual - Engine anti-icing system		٧				
207		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ECAM.		٧				
208		Flaws in manufacturer quality control process - ECAM (or similar) system components.		V				
209		Flaws in manufacturer quality control process - Fire extinguishing system components		٧		٧	٧	
210		Flaws in manufacturer quality control process - APU systems and / or components		٧				
211		Flaws in aircraft system maintenance process definition - Engine combustor		٧				
212		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine combustor		٧				
213		Flaws in manufacturer quality control process - Engine combustor		٧				
214		Flaws in aircraft system maintenance process definition - Engine turbine components		٧				
215		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine turbine components		V				
216		Flaws in manufacturer quality control process - Engine turbine components		٧				
217		Failure to check navigation accuracy before approach			V			



	Safety Performance	Data sussession		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
218		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. Navigational aid failure.			V		1	
219		Incorrect or confusing / misleading ATC instructions		٧		V	- 	
220		Not recognized ground Navaids System failure not reflected in NOTAM messages			٧		- 	
221		Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS)			V		- 	
222		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS)			٧			
223		Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS)			V		l	
224		Current airport diagram not reflecting critical changes			V		1	
225		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).			٧			
226		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.				V	V	
227		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.				٧	٧	
228		Flaws in manufacturer quality control process - Communication equipment systems and components.				٧	V	
229		Lack of adherence to SOP for AIR operations in terms of controller error in approach clearence instruction			V			
230		Navigation deviation				٧	V	
231		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components		V			٧	
232		Flaws in aircraft system maintenance process definition - Hydraulic System		V			V	
233		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components		٧			٧	
234		Flaws in aircraft system maintenance process definition - Fire detection system components		V			V	
235		Flaws in manufacturer quality control process - Fire detection system components		V			V	
236		Flaws in aircraft system maintenance process definition - Fire warning system		V			V	
237		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system		٧			٧	
238		Flaws in manufacturer quality control process - Fire warning system		V			V	
239		Hearback ommitted				V		
240		Lack of adherence to Rules of the Air - adherence to Controller clearance				V		
241		Flaws in aircraft system maintenance process definition - Electrical wiring System		V				
242		Unintuitive and / or error prone system manual - communication equipment.				V		



	Safety Performance	P		Operational issue 1 2 3 4 5 V V V V V V V V V V V V V V V V V V				
No.	Indicators	Precursors	1	2	3	4	5	6
243		Altitude deviation				٧		
244		Level bust (pilot lapse or late re-clearance by ATC)				V		
245		Incorrect use of communication equipment				V		
246		Separation of structural element / component of the aircraft during take-off or landing		٧				
247		Flaws in aircraft system maintenance process definition - Engine systems and / or components		٧				
248		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Electrical / wiring system components		٧				
249		Flaws in manufacturer quality control process - Electrical / wiring systems components		V				
250		Lack of adherence to SOP in terms of fuelling procedure		V				
251		Failure to comply with an altitude or speed restriction / constraint				V		
252		Flaws in Airspace and Air Traffic planning procedures design process				V		
253		Deviation from flight trajectory commanded by controller				V		
254		Inadequate maintenance of fire vulnerable aircraft parts or components		٧				
255		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements in terms of fire resistance		V				
256		Lack of adherence to regulations concerning transport of DGR goods		V				
257		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Anti-icing system components		٧				
258		Lack of adherence to engine limitations		V				
259		Lack of adherence to SOP for take-off procedure in terms of altimeter callibration.				V		
260		Flaws in conflict and separation minima infringement detection / elimination procedures				V		
261		Military activity in controlled airport or located within controlled area				٧		
262		General aviation activity in controlled airport or located within controlled area				V		
263		Intensified traffic related to general aviation activity e. g. over GA airport / airfield				٧		
264		Tactical or / and Planning Controller tiredness - Inadequate workload distribution				V		
265		Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology				V		
266		Inadequate coordination between ATM centers and/or ATC sectors				V		
267		Lack of adherence of airlines to time contraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data.				٧		
268		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MTCD System		_		٧		



	Safety Performance	Ducasinos		Operational issue 1 2 3 4 5 V V					
No.	Indicators	Precursors	1	2	3	4	5	6	
269		Lack of adherence of airlines to declared Flight Plan.				V			
270		Failure to identify the pre-tactical conflict before it reach the tactical controller				V			
271		Lack of adherence to SOP for Airborne operation in terms of minimum seprataion				V			
272		Flaws in manufacturer quality control process - Anti-icing system components		٧					
273		Flaws in aircraft system maintenance process definition - Anti-icing systems components		V					
274		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of fire detection / warning or / and extinguishing system.		٧					
275		Imbalanced and inaproppriate relation between cpt and his subordinates			V				
276		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components		V			٧		
277		Unintuitive and / or error prone system manual - CPCS		٧			٧	٧	
278		Flaws in aircraft system maintenance process definition - Fire extinguishing system components		V			٧		
279		Lack of adherence to AFM in terms of emergency procedures - engine restart procedure		٧					
280		Lack of adherence to SOP in terms of awareness on supporting systems warning		V					
281		Difference indications of independent aircraft speed / altitude or attitude indicators		V					
282		Unintuitive and / or error prone system manual - ECAM		V					
283		Descent above desired descent profile		V				٧	
284		High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,)		٧				٧	
285		Late deceleration and configuration set-up for approach and landing		٧				٧	
286		DME / ILS DME confusion in assessing the final descent point / FAF		V				٧	
287		Unstabilized final approach (high, fast, steep,)		V				٧	
288		Flaws in manufacturer quality control process - Engine sensors		V					
289		Flaws in aircraft system maintenance process definition - Engine sensors		٧					
290		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine sensors		V					
291		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine		V			٧		
292		Flaws in manufacturer quality control process - Autothrottle system in the engine.		٧			٧		
293		Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.		٧			V		
294		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of STCA System.				V			



	Safety Performance	Discourage		Ор	eration	al issu	<u> </u>	
No.	Indicators	Precursors	1	2	3	4	5	6
295		Lack of adherence to regulations concerning independent ATCO monitoring				٧		
296		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - STCA System				V		
297		Lack of adherence to AFM in terms of emergency procedures - fire detection and extinguishing procedure		V				
298		Go-around attempt after thrust reversers deployment		V				V
299		Lack of adherence to SOP in terms of aircraft icing (condition) monitoring		V				
300		Lack of adherence to AFM limitations for landing		V				٧
301		Excessive pitch attitude		V				
302		Excessive bank angle		V				
303		Inadequate effectivenes of fire extinguishing system		V				
304		Incorrect use of automation - Anti-icing system		V				
305		Unintuitive and / or error prone system manual - Anti-icing system		V				
306		Lack of adherence to SOP in terms of pre-flight inspections -presence of anti-contamination covers on pitot static tube		V				
307		Lack of adherence to SOP in terms of briefing and checklist before initiating of start of taxiing and take-off		V				
308		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Pitot static system components		٧				
309		Flaws in manufacturer quality control process - Pitot static system components		V				
310		Flaws in aircraft system maintenance process definition - Pitot static systems components		V				
311		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ADI		٧				
312		Flaws in manufacturer quality control process - ADI		V				
313		Flaws in aircraft system maintenance process definition - ADI		V				
314		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ASI		٧				
315		Flaws in manufacturer quality control process - ASI		V				
316		Flaws in aircraft system maintenance process definition - ASI		V				
317		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine fuel distribution system		٧				
318		Flaws in manufacturer quality control process - Engine fuel distribution system		V				
319		Flaws in aircraft system maintenance process definition - Engine fuel distribution system		V				
320		Unintuitive and / or error prone system manual - fire extinguishing system		V				



	Safety Performance	Pro course		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
321		Lack of adherence to AFM limitations for Take-off		V				
322		Lack of adherence to SOP in terms of requested information support for other aircraft in terms of adverse weather conditions		٧				
323		Lack of adherence to SOP in terms of application of findings from weather report		V				
324		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PFD		٧				
325		Flaws in manufacturer quality control process - PFD		V				
326		Flaws in aircraft system maintenance process definition - PFD		V				
327		Incorrect weather report obtained by the flight crew		V				
328		Lack of adherence to SOP in terms of providing flight crew with current weather report		V				
329		Lack of adherence of passengers to the recommendation: Fasten seat belt while seated		V				
330		Lack of adherence to SOP in terms of "fasten your seat belt" information activation in passenger cabin during flight in turbulence conditions		٧				
331		Lack of adherence to AFM in terms of emergency procedures - stall recovery		V				
332		Lack of adherence to emergency procedures - recovery from severe FCS failure		V				
333		Unintuitive and / or error prone system manual - On-board weather radar.		V				
334		Incorrect use of automation - On-board weather radar		V				
335		Inadequate airline / regulatory provider policy in terms of aware of the risks related to air travel		V				
336		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - On-board weather radar		٧				
337		Flaws in manufacturer quality control process - On-board weather radar		V				
338		Flaws in aircraft system maintenance process definition - On-board weather radar		V				
339		Flight below maneuvering speeds		V				
340		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components					٧	
341		Flaws in manufacturer quality control process - Power supply system components					V	
342		Lack of adherence to the current technology standards in terms of flight safety and efficiency - fuel tank allocation.		٧				
343		Lack of adherence to SOP in terms of AFM limitations in terms of weigh and balance		٧				
344		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Thrust reverse system in the engine.		٧				
345		Flaws in manufacturer quality control process - Thrust reverse system in the engine.		V				



	Safety Performance	December 2		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
346		Flaws in aircraft system maintenance process definition - Thrust reverse system in the engine.		V				
347		Lack of adherence to SOP in terms of pre-flight inspections - cargo securing quality		V				
348		Error in calculation of necessary amount of fuel		V				V
349		Lack of adherence to SOP in terms of load sheet preparation and verification		V				
350		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components		V				
351		Flaws in aircraft system maintenance process definition - Aircraft door system and / or components		V				
352		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FCS system or components		V				
353		Flaws in manufacturer quality control process - FCS system components		V				
354		Flaws in aircraft system maintenance process definition - FCS systems or components		V				
355		Flaws in manufacturer quality control process - CPCS system and / or components		V				
356		Flaws in aircraft system maintenance process definition - CPCS system and / or components		V				
357		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - CPCS system and / or components		V				
358		Lack of adherence to SOP for GND movements.		V				
359		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					V	
360		Poor application of T/O & RTO procedure, failure recognition and preparedness					V	
361		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Rudder components.		V				
362		Flaws in aircraft system maintenance process definition - Rudder components.		V				
363		Flaws in manufacturer quality control process - Rudder components.		V				
364		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Horizontal stabilizer components.		V				
365		Flaws in aircraft system maintenance process definition - Horizontal stabilizer components.		V				
366		Flaws in manufacturer quality control process - Horizontal stabilizer components.		٧				
367		Lack of adherence to emergency procedures - flight deck smoke procedure		V				
368		Lack of adherence to the SOP in terms of critical maneuvre execution - flare		٧				
369		Extreme operation condition / poor maintenance quality / advanced life lenght		٧				
370		Incorrect use of automation - CPCS	1	٧				
371		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice		V			V	V



	Safety Performance	Precursors		Op	eration	al issu	e	
No.	Indicators	FIECUISOIS	1	2	3	4	5	6
		presence / or runway surface friction rate below minimum						<u> </u>
372		Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain)			V			
373		Premature descent to DA(H) before G/S intercept or premature descent to MDA(H) before final-descent-point / FAF			V			
374		Premature descent below MDA(H) before reaching the visual-descent-point (VDP)			V			
375		Flight below desired flight path during initial and/or final approach			V			
376		Continued approach, when below DA(H) or MDA(H), after loss of visual references			V			
377		Late or inadequate response to MSAW warning			V			
378		Failure to go-around, when so required			V			
379		Failure to follow published missed-approach procedure			V			
380		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of MSAW system.			V			
381		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MSAW System			V			
382		Lack of adherence to the current technology standards in terms of flight safety and efficiency - engines location.		V				
383		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. MSAW warning.			V			
384		Late activation of pedal braking or takeover from autobrake, when so required		V				٧
385		Delayed selection of reverse thrust		V				٧
386		Late thrust reduction or power-on touchdown		V				٧
387		Failure to arm ground-spoilers		V				٧
388		Inappropriate selection of autobrake mode for given runway length and condition		V				٧
389		Lack of adherence to SOP in terms of necessary amount of fuel		V				٧
390		Lack of adherence to AFM in terms of emergency procedures - engine failure		V				
391		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment					V	
392		Poor application of T/O & RTO procedure, braking initiation sequence					٧	
393		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.					٧	
394		Poor application of T/O & RTO procedure, computation of T/O parameters					٧	
395		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ACAS system components				V		
396		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS			V			
397		Inappropriate visual avoidance maneuver				V		



	Safety Performance	Ducassuracus		Ор	eration	al issu		
No.	Indicators	Precursors	1	2	3	4	5	6
398		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ADI system components				٧		
399		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ACAS installed on aircraft.				V		
400		Late or inadequate response to ACAS warning	İ			V		1
401		Flaws in aircraft system maintenance process definition - GPWS system components			V			
402		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - GPWS system components			٧			
403		Flaws in manufacturer quality control process - GPWS system components	İ		V			1
131	Rate of high speed rejected take-off/attempted take-off	Pilot tiredness - Inadequate workload distribution	V	V			٧	
132		Flaws in pilot requirements definition process and/or training methodology	٧	V			V	1
133		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	V	V			٧	
134		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	٧	V			V	
135		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	V	٧			٧	
136		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.		V			V	
137		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring		V			V	
138		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		V			V	
139		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components		٧			٧	
140		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		٧			V	
141		Flaws in manufacturer quality control process - Engine systems and / or components		V			٧	
142		Inadequate aircraft de-icing / anti-icing		V			٧	
143		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fuel system components		٧				
144		Flaws in aircraft system maintenance process definition - Fuel system compoonents		V				
145		Lack of adherence to SOP in terms of de-icing / anti-icing procedures.		٧			V	
146		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.		V			٧	
147		Flaws in aircraft system maintenance process definition - Components of Wing control surface system.		٧			٧	
148		Flaws in manufacturer quality control process - Components of Wing control surface system.		V			V	



	Safety Performance	Drocursors		Ор	erationa	al issu	e	-
No.	Indicators	Precursors	1	2	3	4	5	6
149		Unintuitive and / or error prone system manual - CPCS		V			V	
150		Traffic controller tiredness - Inadequate workload distribution	٧	٧			V	
151		Flaws in traffic controller requirements definition process and/or training methodology	V	V			V	
152		Lack of adherence to the SOP in terms of critical indicators cross-checking		V				
153		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Integrity of primary aircraft structure.		V				
154		Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.		V				
155		Flaws in manufacturer quality control process - Integrity of primary aircraft structure.		V				
156		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components		V			V	
157		Flaws in aircraft system maintenance process definition - APU systems and / or components		V			V	<u> </u>
158		Aggressive maneuvering / overcontrolling		V				
159		Lack of adherence to SOP in terms of AFM limitations		V				
160		Flaws in manufacturer quality control process - Fuel system components.		٧				
161		Flaws in aircraft system maintenance process definition - Engine systems and / or components		V			V	
162		Lack of adherence to SARPs in terms of avoiding adverse weather conditions during flight		V				
163		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Reduction gear in the engine		V				
164		Flaws in manufacturer quality control process - Reduction gear in the engine.		٧				
165		Flaws in aircraft system maintenance process definition - Reduction gear in the engine.		٧				
166		Incorrect use of automation -Engine anti-ice system		V				
167		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Compressor in the engine		٧				
168		Flaws in manufacturer quality control process - Compressor in the engine.		V				
169		Flaws in aircraft system maintenance process definition - Compressor in the engine.		V				
170		Flaws in manufacturer quality control process - Engine accessory drive components.		V				
171		Flaws in aircraft system maintenance process definition - Engine accessory drive components.		V				
172		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine accessory drive components.		V				
173		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ECAM (or similar) system components.		V				



	Safety Performance	Precursors		Op	eration	al issu	e	
No.	Indicators	Frecuisors	1	2	3	4	5	6
174		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine anti-ice systems and / or components		V				
175		Flaws in manufacturer quality control process - Engine anti-ice system and / or components		٧				1
176		Flaws in aircraft system maintenance process definition - Engine anti-ice system and / or components		V				
177		Flaws in aircraft system maintenance process definition - Oil distribution system		V				
178		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Oil distribution system		V				
179		Flaws in manufacturer quality control process - Oil distribution system		V				ł
180		Flaws in aircraft system maintenance process definition - ECAM (or similar) system components.		٧				
181		Flaws in manufacturer quality control process - ECAM (or similar) system components.		V				
182		Lack of adherence to emergency procedures - Fuel starvation		V				
183		Inadequate de-icing method applied		V				
184		Unintuitive and / or error prone system manual - Engine anti-icing system		V				
185		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					٧	
186		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ECAM.		V				
187		Flaws in manufacturer quality control process - Landing gear components.		V				
188		Flaws in aircraft system maintenance process definition - Landing gear components.		V				
189		Flaws in manufacturer quality control process - APU systems and / or components		V				
190		Flaws in aircraft system maintenance process definition - Engine combustor		V				
191		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine combustor		٧				
192		Flaws in manufacturer quality control process - Engine combustor		V				
193		Flaws in aircraft system maintenance process definition - Engine turbine components		V				
194		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine turbine components		٧				
195		Flaws in manufacturer quality control process - Engine turbine components		٧				1
196		Lack of or poor communication quality	V				٧	
197		Flaws in aircraft system maintenance process definition - Electrical wiring System		٧			٧	
198		Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.					٧	
199		Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.					V	



	Safety Performance	December		Ор	eration	al issu	<u> </u>	
No.	Indicators	Precursors	1	2	3	4	5	6
200		Incorrect stab-trim setting					V	
201		Lack of English proficiency	V	V			٧	
202		Incorrect or confusing / misleading ATC instructions	V	V			٧	
203		Use of non-standard phraseology by pilot and/or controller	V	V			٧	
204		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components		V			V	
205		Flaws in aircraft system maintenance process definition - Hydraulic System		V			٧	
206		Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.	V				٧	
207		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components		V			V	
208		Flaws in aircraft system maintenance process definition - Fire detection system components		V			V	
209		Flaws in manufacturer quality control process - Fire detection system components		V			٧	
210		Flaws in aircraft system maintenance process definition - Fire warning system		V			٧	
211		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system		٧			V	
212		Flaws in manufacturer quality control process - Fire warning system		V			٧	
213		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity	٧				V	
214		Takeoff without clearance	V				٧	
215		Landing without clearance	V				٧	
216		Lack of adherence to AFM limitations for Take-off		V			٧	
217		Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	V				٧	
218		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence	V				٧	
219		Lack of adherence to SOP for GND movements.	V	V				
220		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	V				٧	
221		Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	V				٧	
222		Unintuitive and / or error prone system manual - FMC					V	
223		Undetected incorrect takeoff configuration					V	
224		Separation of structural element / component of the aircraft during take-off or landing		٧				
225		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Electrical / wiring system components		V				



	Safety Performance	Descriptions	T	Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
226		Flaws in manufacturer quality control process - Electrical / wiring systems components		V			1	
227		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum					٧	
228		Lack of adherence to SOP in terms of fuelling procedure		V			1	
229		Inadequate maintenance of fire vulnerable aircraft parts or components		V				
230		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements in terms of fire resistance		V				
231		Lack of adherence to regulations concerning transport of DGR goods		V			l	
232		Lack of adherence to engine limitations		V			1	
233		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components		V			٧	
234		Inadvertent deviation from cleared taxi route	V				<u> </u>	
235		Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling		V			V	
236		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of fire detection / warning or / and extinguishing system.		V				
237		Flaws in manufacturer quality control process - Power supply system components		V			V	
238		Poor application of T/O & RTO procedure, aircraft handling					V	
239		Flaws in aircraft system maintenance process definition - Fire extinguishing system components		V			V	
240		Flaws in manufacturer quality control process - Fire extinguishing system components		V			V	
241		Current airport diagram not reflecting critical changes	V					
242		Poor application of T/O & RTO procedure, failure recognition and preparedness					V	
243		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components					٧	
244		Callsign confusion	V				1	
245		Unintuitive and / or error prone system manual - ground radar.	٧				V	
246		Failure to remember / assess crosswind component limit for prevailing runway condition					V	
247		Lack of adherence to SOP in terms of ATCO and approach or ground controller communication	V					
248		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground Radar	V					
249		Hearback ommitted	V					
250		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ground radar at the airport.	V					



	Safety Performance	Disamusa a		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
251		Lack of adherence to SOP in terms of awareness on supporting systems (warning) - ground radar.	V					
252		Late rejected takeoff decision / initiation					٧	
253		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).		V				
254		Lack of adherence to Rules of the Air - adherence to Controller clearance					V	
255		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)		V			V	
256		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)		V			V	
257		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)		V			V	l
258		Lack of adherence to AFM in terms of emergency procedures - engine restart procedure		V				
259		Lack of adherence to SOP in terms of awareness on supporting systems warning		V				
260		Unintuitive and / or error prone system manual - ECAM		V				
261		Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations					V	
262		Flaws in manufacturer quality control process - Engine sensors		V				
263		Flaws in aircraft system maintenance process definition - Engine sensors		V				
264		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine sensors		٧				
265		Lack of adherence to AFM in terms of emergency procedures - stall recovery		V			V	
266		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine		V			٧	
267		Flaws in manufacturer quality control process - Autothrottle system in the engine.		V			V	
268		Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.		V			٧	
269		Lack of adherence to AFM in terms of emergency procedures - fire detection and extinguishing procedure		V				
270		Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications	٧				V	
271		Slow rotation (i.e., low pitch rate)					٧	
272		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FCS system or components					V	
273		Flaws in manufacturer quality control process - FCS system components					V	
274		Flaws in aircraft system maintenance process definition - FCS systems or components					٧	
275		Incorrect use of automation - TOCW System					٧	



	Safety Performance	Discourage	T	Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
276		Flaws in aircraft system maintenance process definition - TOCW System					٧	
277		Unintuitive and / or error prone system manual - TOCW					V	
278		Inadequate effectivenes of fire extinguishing system		٧				
279		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System					٧	
280		Difference indications of independent aircraft speed / altitude or attitude indicators		V				
281		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Anti-icing system components		V				
282		Flaws in manufacturer quality control process - Anti-icing system components		V				
283		Flaws in aircraft system maintenance process definition - Anti-icing systems components		٧				
284		Lack of adherence to SOP in terms of pre-flight inspections -presence of anti-contamination covers on pitot static tube		٧				
285		Lack of adherence to SOP in terms of briefing and checklist before initiating of start of taxiing and take-off		٧				
286		Lack of adherence to SOP for take-off procedure in terms of speed bug checklist preparation and verification.					٧	
287		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PFD		V				
288		Flaws in manufacturer quality control process - PFD		٧				
289		Flaws in aircraft system maintenance process definition - PFD		٧				
290		Unintuitive and / or error prone system manual - fire extinguishing system		٧				
291		Excessive bank angle		٧				
292		Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared		٧				
293		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System.		٧				
294		Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination		٧				
295		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system		V				
296		Flaws in manufacturer quality control process - PWS system components		٧				
297		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.		٧				
298		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - LLWAS system		V				
299		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Pitot static system components		V				
300		Flaws in manufacturer quality control process - Pitot static system components		V				



	Safety Performance	Discourses		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
301		Flaws in aircraft system maintenance process definition - Pitot static systems components		V			1	
302		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ADI		V				
303		Flaws in manufacturer quality control process - ADI		V				
304		Flaws in aircraft system maintenance process definition - ADI		V				
305		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ASI		V				
306		Flaws in manufacturer quality control process - ASI		V				
307		Flaws in aircraft system maintenance process definition - ASI		V				
308		Poor application of T/O & RTO procedure, braking initiation sequence					V	
309		Lack of adherence to SOP in terms of load sheet preparation and verification		V				
310		Lack of adherence to SOP in terms of AFM limitations in terms of weigh and balance		V				
311		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.					V	
312		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.					٧	
313		Flaws in manufacturer quality control process - Communication equipment systems and components.					V	
314		Flaws in Airspace and Air Traffic planning procedures design process					V	
315		Lack of adherence to emergency procedures - recovery from severe FCS failure		V				
316		Flaws in airport capacity management process					V	
317		Flaws in aircraft system maintenance process definition - stickshaker		V			V	
318		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - stickshaker system components		٧			٧	
319		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment					V	
320		Lack of adherence to SOP in terms of awareness on supporting systems warning - stickshaker		V			V	
321		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.					V	
322		Flaws in CRM training procedures					V	
323		Lack of adherence to the main CRM rules					٧	
324		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Rudder components.		V				
325		Flaws in aircraft system maintenance process definition - Rudder components.		٧				
326		Flaws in manufacturer quality control process - Rudder components.		V				



	Safety Performance	Discourage		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
327		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Horizontal stabilizer components.		٧				
328		Flaws in aircraft system maintenance process definition - Horizontal stabilizer components.		V				
329		Flaws in manufacturer quality control process - Horizontal stabilizer components.		V				
330		Navigation deviation					V	
331		Lack of adherence to SOP for take-off procedure in terms of time limitation for take-off preparation.					V	
332		Lack of adherence to SOP in terms of pre-flight inspections - cargo securing quality		V				
333		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components					V	
334		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.					V	
335		Flaws in manufacturer quality control process - Onboard navigational systems and components.					٧	
336		Lack of adherence to SOP in terms of awareness on supporting systems (warning) - RIMCAS.	V					
337		Lack of adherence to emergency procedures - WEM		V				
338		Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing					V	
339		Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.					V	
340		Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT)					V	
341		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - antiice fluid HOT					٧	
342		Applied de-icing / anti-icing method is not sufficient for predicted conditions					V	
343		Lack of adherence to SOP in terms of aircraft icing (condition) monitoring					V	
344		Lack of adherence to the current technology standards in terms of flight safety and efficiency - fuel tank allocation.		V				
345		Poor application of T/O & RTO procedure, computation of T/O parameters					V	
346		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine fuel distribution system		V				
347		Flaws in manufacturer quality control process - Engine fuel distribution system		V				
348		Flaws in aircraft system maintenance process definition - Engine fuel distribution system		V				
349		Lack of adherence to emergency procedures - RWY collision avoidance	V					
350		Lack of adherence to ICAO Annex 14 and related documents in terms of airside lights distribution	V					
351		Lack of adherence to ICAO Annex 14 and related documents in terms of nonrestricted view on airsite from TWR	V					
352		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of Runway Conflict Warning System.	V					



	Safety Performance	Dana sa sa sa sa sa sa sa sa sa sa sa sa sa		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
353		Flight below maneuvering speeds		V				
354		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - RCWS	V					
355		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Thrust reverse system in the engine.		V				
356		Flaws in manufacturer quality control process - Thrust reverse system in the engine.		V				<u> </u>
357		Flaws in aircraft system maintenance process definition - Thrust reverse system in the engine.		V				
358		Error in calculation of necessary amount of fuel		V				
359		Lack of adherence to emergency procedures - flight deck smoke procedure		V				
360		Lack of adherence to AFM in terms of emergency procedures - windshear recovery		V				
361		Lack of adherence to the SOP in terms of critical maneuvre execution - flare		V				
362		Extreme operation condition / poor maintenance quality / advanced life lenght		V				
363		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components		٧				
364		Flaws in aircraft system maintenance process definition - Aircraft door system and / or components		V				
365		Lack of adherence to the current technology standards in terms of flight safety and efficiency - engines location.		V				
366		Flaws in manufacturer quality control process - CPCS system and / or components		V				
367		Flaws in aircraft system maintenance process definition - CPCS system and / or components		V				
368		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - CPCS system and / or components		٧				
369		Incorrect use of automation - CPCS		V				
370		Lack of adherence to AFM in terms of emergency procedures - engine failure		V				
371		Inadequate stall recovery procedure for the aircraft					V	
372		Inadequate management / separation of takeoffs and landings	V					
373		Flaws in manufacturer quality control process - TOCW system components					٧	
374		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment		٧				
375		Flaws in manufacturer quality control process - Stickshaker system components					٧	
131	Rate of continued approach (go around not conducted) following unstabilised approach/approach	Pilot tiredness - Inadequate workload distribution	V	V	V		V	V



	Safety Performance	Draningara		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
132		Flaws in pilot requirements definition process and/or training methodology	V	V	٧		٧	٧
133		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	V	V	٧		٧	٧
134		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	V	V	٧		٧	٧
135		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	٧	٧	٧		٧	٧
136		Incorrect use of automation - FMS		V	٧			٧
137		Unintuitive and / or error prone system manual - FMS		V	V			V
138		Flaws in CRM training procedures		V	٧		V	V
139		Lack of adherence to the main CRM rules		V	V		V	V
140		Lack of adherence to SOP in terms of approach and landing		V	٧			V
141		Lack of adherence to the SOP in terms of critical indicators cross-checking		V	V			
142		Aggressive maneuvering / overcontrolling		V				V
143		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		٧			٧	٧
144		Flaws in traffic controller requirements definition process and/or training methodology	V		V		V	V
145		Traffic controller tiredness - Inadequate workload distribution	V		V		V	V
146		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.		٧	٧			٧
147		Lack of or poor communication quality	V		٧		٧	
148		Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport in the case of adverse weather.		V				V
149		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path		V				V
150		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring		V			V	V
151		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).		V	V			V
152		Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing		V				V
153		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.		V			٧	٧
154		Use of non-standard phraseology by pilot and/or controller	V		V		٧	
155		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		V			V	V
156		Lack of English proficiency	V		V		V	



	Safety Performance	Draguesara	T	Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
157		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	V		V		V	
158		Inadequate aircraft de-icing / anti-icing		V			V	
159		Lack of adherence to emergency procedures - control recovery		V				٧
160		Current airport diagram not reflecting critical changes	V		٧			
161		Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure		V				٧
162		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.		٧			٧	
163		Flaws in aircraft system maintenance process definition - Components of Wing control surface system.		V			V	
164		Flaws in manufacturer quality control process - Components of Wing control surface system.		V			V	
165		Flaws in aircraft system maintenance process definition - Landing gear components.		V				
166		Lack of adherence to SOP in terms of AFM limitations		V				
167		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Integrity of primary aircraft structure.		V				
168		Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.		V				
169		Flaws in manufacturer quality control process - Integrity of primary aircraft structure.		V				
170		Flaws in manufacturer quality control process - Landing gear components.		V				
171		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fuel system components		V				
172		Flaws in aircraft system maintenance process definition - Fuel system compoonents		V				
173		Lack of adherence to SARPs in terms of avoiding adverse weather conditions during flight		V				
174		Flaws in manufacturer quality control process - Fuel system components.		V				
175		Incorrect use of automation -Engine anti-ice system		V				
176		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)			٧		٧	
177		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine anti-ice systems and / or components		٧				
178		Flaws in manufacturer quality control process - Engine anti-ice system and / or components		V				
179		Flaws in aircraft system maintenance process definition - Engine anti-ice system and / or components		V				
180		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components			V		V	
181		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.			٧		V	



	Safety Performance	Discourage		Op	erationa	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
182		Flaws in manufacturer quality control process - Onboard navigational systems and components.			٧		٧	
183		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Reduction gear in the engine		V				
184		Flaws in manufacturer quality control process - Reduction gear in the engine.		V				
185		Flaws in aircraft system maintenance process definition - Reduction gear in the engine.		V				
186		Lack of adherence to emergency procedures - Fuel starvation		V				
187		Inadequate de-icing method applied		V				
188		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Compressor in the engine		V				
189		Flaws in manufacturer quality control process - Compressor in the engine.		V				
190		Flaws in aircraft system maintenance process definition - Compressor in the engine.		V				
191		Flaws in manufacturer quality control process - Engine accessory drive components.		V				
192		Flaws in aircraft system maintenance process definition - Engine accessory drive components.		V				
193		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine accessory drive components.		V				
194		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ECAM (or similar) system components.		V				
195		Flaws in aircraft system maintenance process definition - ECAM (or similar) system components.		V				
196		Unintuitive and / or error prone system manual - Engine anti-icing system		V				
197		Lack of adherence to SOP in terms of de-icing / anti-icing procedures.		V				
198		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ECAM.		V				
199		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)			V		V	
200		Flaws in manufacturer quality control process - ECAM (or similar) system components.		V				
201		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)			V		V	
202		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components		V				
203		Flaws in aircraft system maintenance process definition - Oil distribution system		V				
204		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Oil distribution system		V				
205		Flaws in manufacturer quality control process - Oil distribution system		V				
206		Flaws in manufacturer quality control process - Engine systems and / or components		V				



	Safety Performance	D		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
207		Flaws in aircraft system maintenance process definition - Engine combustor		V				
208		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine combustor		٧				
209		Flaws in manufacturer quality control process - Engine combustor		V				
210		Flaws in aircraft system maintenance process definition - Engine turbine components		V				
211		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine turbine components		٧				
212		Flaws in manufacturer quality control process - Engine turbine components		V			l	
213		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS)			>			
214		Failure to check navigation accuracy before approach			V			
215		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. Navigational aid failure.			V			
216		Not recognized ground Navaids System failure not reflected in NOTAM messages			V			
217		Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS)			V			
218		Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS)			V			
219		Unintuitive and / or error prone system manual - CPCS					V	٧
220		Altimeter setting error			V			
221		Lack of adherence to SOP for AIR operations in terms of controller error in approach clearence instruction			V			
222		Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination			٧			
223		Incorrect or confusing / misleading ATC instructions	٧		V		V	
224		Landing without clearance	٧				V	
225		Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	V				٧	
226		Takeoff without clearance	V				٧	
227		Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	V				V	
228		Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.	V				٧	
229		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence	V				٧	
230		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity	٧				V	
231		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components		V			V	



	Safety Performance	Discourage		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
232		Flaws in aircraft system maintenance process definition - APU systems and / or components		V			V	
233		High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,)		V				V
234		Late deceleration and configuration set-up for approach and landing		V				V
235		DME / ILS DME confusion in assessing the final descent point / FAF		V				V
236		Unstabilized final approach (high, fast, steep,)		V				V
237		Imbalanced and inaproppriate relation between cpt and his subordinates			V			
238		Lack of adherence to SOP in terms of ATCO and approach or ground controller communication	V					
239		Descent above desired descent profile		V				V
240		Inadvertent deviation from cleared taxi route	V					
241		Lack of adherence to SOP for GND movements.	V					
242		Callsign confusion	V					
243		Unintuitive and / or error prone system manual - ground radar.	V					
244		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground Radar	V					
245		Hearback ommitted	V					
246		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ground radar at the airport.	V					
247		Lack of adherence to SOP in terms of awareness on supporting systems (warning) - ground radar.	V					
248		Lack of adherence to AFM limitations for landing		V				V
249		Lack of adherence to AFM in terms of emergency procedures - engine restart procedure		V				
250		Flaws in manufacturer quality control process - APU systems and / or components		V				
251		Lack of adherence to SOP in terms of awareness on supporting systems warning		V				
252		Unintuitive and / or error prone system manual - ECAM		V				
253		Flaws in manufacturer quality control process - Engine sensors		V				
254		Flaws in aircraft system maintenance process definition - Engine sensors		V				
255		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine sensors		V				
256		Go-around attempt after thrust reversers deployment		V				V
257		Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared						V



	Safety Performance	Discourage		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
258		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System.						٧
259		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system						٧
260		Lack of adherence to Rules of the Air - adherence to Controller clearance					V	
261		Flaws in manufacturer quality control process - PWS system components						V
262		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.						V
263		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - LLWAS system						٧
264		Excessive pitch attitude		V				
265		Excessive bank angle		V				
266		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					V	
267		Lack of adherence to the SOP in terms of critical maneuvre execution		V				
268		Difference indications of independent aircraft speed / altitude or attitude indicators		V				
269		Lack of adherence to SOP in terms of safety best practices		V				
270		Flaws in aircraft system maintenance process definition - ADI system components		V				
271		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ADI system components		٧				
272		Flaws in manufacturer quality control process - ADI system components		V				
273		Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications					٧	
274		Lack of adherence to SOP for take-off procedure in terms of time limitation for take-off preparation.					٧	
275		Lack of adherence to emergency procedures - WEM						V
276		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components					٧	
277		Flaws in manufacturer quality control process - Power supply system components					٧	
278		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.					V	
279		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.					٧	
280		Flaws in manufacturer quality control process - Communication equipment systems and components.					V	
281		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine					V	
282		Navigation deviation					V	



	Safety Performance	Descriptions		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
283		Flaws in Airspace and Air Traffic planning procedures design process					٧	
284		Flaws in manufacturer quality control process - Autothrottle system in the engine.					V	
285		Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.					٧	
286		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components					٧	
287		Flaws in aircraft system maintenance process definition - Hydraulic System					٧	
288		Flaws in airport capacity management process					٧	
289		Tailwind component above limit						٧
290		Flaws in aircraft system maintenance process definition - Fire detection system components					V	
291		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components					٧	
292		Flaws in manufacturer quality control process - Fire detection system components					٧	
293		Flaws in aircraft system maintenance process definition - Fire warning system					V	
294		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system					٧	
295		Flaws in manufacturer quality control process - Fire warning system					V	
296		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components					٧	
297		Flaws in aircraft system maintenance process definition - Fire extinguishing system components					٧	
298		Flaws in manufacturer quality control process - Fire extinguishing system components					٧	
299		Lack of adherence to SOP in terms of awareness on supporting systems (warning) - RIMCAS.	V					
300		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum		V			٧	٧
301		Error in calculation of necessary amount of fuel		V				٧
302		Late rejected takeoff decision / initiation					٧	
303		Lack of adherence to emergency procedures - RWY collision avoidance	V					
304		Lack of adherence to ICAO Annex 14 and related documents in terms of airside lights distribution	V					
305		Lack of adherence to ICAO Annex 14 and related documents in terms of nonrestricted view on airsite from TWR	V					
306		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of Runway Conflict Warning System.	V					
307		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - RCWS	V					



	Safety Performance	Precursors	1	Ор	eration	al issu	e	
No.	Indicators	Precuisors	1	2	3	4	5	6
308		Poor application of T/O & RTO procedure, failure recognition and preparedness					V	
309		Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations					V	
310		Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain)			V			
311		Premature descent to DA(H) before G/S intercept or premature descent to MDA(H) before final-descent-point / FAF			V			
312		Premature descent below MDA(H) before reaching the visual-descent-point (VDP)			V			
313		Flight below desired flight path during initial and/or final approach			V			
314		Continued approach, when below DA(H) or MDA(H), after loss of visual references			V			
315		Late or inadequate response to MSAW warning			V			
316		Failure to go-around, when so required			V			
317		Failure to follow published missed-approach procedure			V			
318		Lack of adherence to AFM in terms of emergency procedures - stall recovery		V				
319		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of MSAW system.			V			
320		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MSAW System			٧			
321		Lack of adherence to the current technology standards in terms of flight safety and efficiency - engines location.		V				
322		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. MSAW warning.			V			
323		Late activation of pedal braking or takeover from autobrake, when so required		V				٧
324		Delayed selection of reverse thrust		V				٧
325		Late thrust reduction or power-on touchdown		V				٧
326		Failure to arm ground-spoilers		٧				٧
327		Inappropriate selection of autobrake mode for given runway length and condition		٧				٧
328		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment					V	
329		Poor application of T/O & RTO procedure, braking initiation sequence					V	
330		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.					V	
331		Use of non-standard phraseology by pilot flying (PF) and/or pilot not flying (PNF)		V				
332		Lack of adherence to SOP in terms of necessary amount of fuel		٧				٧
333		Poor application of T/O & RTO procedure, computation of T/O parameters					V	
334		Lack of adherence to AFM in terms of emergency procedures - engine failure		٧				
335		Flaws in aircraft system maintenance process definition - stickshaker			V			



	Safety Performance	Precursors		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
336		Lack of adherence to SOP for approach and landing		V			1	
337		Flaws in aircraft system maintenance process definition - Electrical wiring System		V				
338		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS			V			
339		Taxiing without clearance		V			1	
340		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Electrical / wiring system components		٧				
341		Flaws in manufacturer quality control process - Electrical / wiring systems components		V			l	
342		Flaws in aircraft system maintenance process definition - GPWS system components			V			
343		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - GPWS system components			٧			
344		Flaws in manufacturer quality control process - GPWS system components			٧		<u> </u>	
131	Rate of long landings/landing	Pilot tiredness - Inadequate workload distribution		V	V		V	V
132		Flaws in pilot requirements definition process and/or training methodology		V	V		V	V
133		Lack of adherence to SOP in terms of approach and landing		V	V			V
134		Flaws in CRM training procedures		V	V		1	V
135		Lack of adherence to the main CRM rules		V	V			V
136		Incorrect use of automation - FMS		V	٧			V
137		Unintuitive and / or error prone system manual - FMS		V	٧			V
138		Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing		V			1	V
139		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties		٧	٧			٧
140		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.		V	٧			٧
141		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path		V				٧
142		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology		V	٧		V	V
143		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution		٧	٧		٧	V
144		Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport in the case of adverse weather.		٧				V
145		Lack of adherence to emergency procedures - control recovery		V				٧
146		Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure		V				V



	Safety Performance	Draguesera		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
147		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)			V		٧	
148		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)			V		V	
149		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)			V		V	
150		Lack of or poor communication quality			V		V	
151		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components			V		V	
152		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.			V		٧	
153		Flaws in manufacturer quality control process - Onboard navigational systems and components.			V		V	
154		Traffic controller tiredness - Inadequate workload distribution			V			V
155		Flaws in traffic controller requirements definition process and/or training methodology			V			V
156		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).			V			V
157		Aggressive maneuvering / overcontrolling		V				V
158		Lack of English proficiency			V			
159		Use of non-standard phraseology by pilot and/or controller			٧			
160		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver			V			
161		Current airport diagram not reflecting critical changes			V			
162		Lack of adherence to the SOP in terms of critical indicators cross-checking			V			
163		Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination			V			
164		Altimeter setting error			V			
165		Failure to check navigation accuracy before approach			V			
166		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. Navigational aid failure.			V			
167		Lack of adherence to SOP for AIR operations in terms of controller error in approach clearence instruction			V			
168		Not recognized ground Navaids System failure not reflected in NOTAM messages			V			
169		Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS)			V			
170		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS)			V			
171		Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS)			V			
172		High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,)		V				V



	Safety Performance	Dec company		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
		or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,)						
173		Late deceleration and configuration set-up for approach and landing		V				V
174		Imbalanced and inaproppriate relation between cpt and his subordinates			V		1	
175		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		٧			V	V
176		Descent above desired descent profile		V				V
177		DME / ILS DME confusion in assessing the final descent point / FAF		V				V
178		Unstabilized final approach (high, fast, steep,)		V				V
179		Unintuitive and / or error prone system manual - CPCS					V	V
180		Go-around attempt after thrust reversers deployment		V			 	V
181		Lack of adherence to AFM limitations for landing		V				V
182		Late activation of pedal braking or takeover from autobrake, when so required		V				V
183		Delayed selection of reverse thrust		V				V
184		Inappropriate selection of autobrake mode for given runway length and condition		V				V
185		Inadequate aircraft de-icing / anti-icing					V	
186		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components					٧	
187		Flaws in manufacturer quality control process - Power supply system components					V	
188		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.					V	
189		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.					٧	
190		Flaws in manufacturer quality control process - Communication equipment systems and components.					V	
191		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.					٧	
192		Flaws in aircraft system maintenance process definition - Components of Wing control surface system.					V	
193		Flaws in manufacturer quality control process - Components of Wing control surface system.					V	
194		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine					٧	
195		Navigation deviation					٧	
196		Flaws in manufacturer quality control process - Autothrottle system in the engine.					V	
197		Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.					V	



	Safety Performance	Precursors		Ор	eration	al issu	e	
No.	Indicators	Frecursors	1	2	3	4	5	6
198		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components					٧	
199		Flaws in aircraft system maintenance process definition - Hydraulic System					V	
200		Failure to remember / assess crosswind component limit for prevailing runway condition						V
201		Inadequate crosswind landing / decrab technique						٧
202		Touchdown off centerline						V
203		Inappropriate use of differential reverse thrust						٧
204		Inadequate use of differential braking						٧
205		Use of nose wheel steering tiller during rollout						V
206		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components					٧	
207		Flaws in aircraft system maintenance process definition - APU systems and / or components					V	
208		Flaws in aircraft system maintenance process definition - Fire detection system components					V	
209		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components					٧	
210		Flaws in manufacturer quality control process - Fire detection system components					V	
211		Flaws in aircraft system maintenance process definition - Fire warning system					V	
212		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system					٧	
213		Flaws in manufacturer quality control process - Fire warning system					V	
214		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components					٧	
215		Flaws in aircraft system maintenance process definition - Fire extinguishing system components					V	
216		Flaws in manufacturer quality control process - Fire extinguishing system components					V	
217		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum		٧			٧	٧
218		Flaws in manufacturer quality control process - Landing gear components.		V				
219		Flaws in aircraft system maintenance process definition - Landing gear components.		٧				
220		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					V	
221		Poor application of T/O & RTO procedure, failure recognition and preparedness					V	
222		Failure to arm ground-spoilers		V				V



	Safety Performance	Discourage		Ор	eration	al issu	<u> </u>	
No.	Indicators	Precursors	1	2	3	4	5	6
223		Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain)			V			
224		Premature descent to DA(H) before G/S intercept or premature descent to MDA(H) before final-descent-point / FAF			V			
225		Premature descent below MDA(H) before reaching the visual-descent-point (VDP)			V			
226		Flight below desired flight path during initial and/or final approach			V			
227		Continued approach, when below DA(H) or MDA(H), after loss of visual references			V			
228		Late or inadequate response to MSAW warning			V			
229		Failure to go-around, when so required			V			
230		Failure to follow published missed-approach procedure			V			
231		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of MSAW system.			V			
232		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MSAW System			V			
233		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. MSAW warning.			V			
234		Lack of adherence to emergency procedures - WEM						٧
235		Late thrust reduction or power-on touchdown		V				٧
236		Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared						٧
237		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System.						٧
238		Error in calculation of necessary amount of fuel		V				٧
239		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system						V
240		Lack of adherence to SOP in terms of necessary amount of fuel		V				٧
241		Flaws in manufacturer quality control process - PWS system components						٧
242		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.						٧
243		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - LLWAS system						V
244		Tailwind component above limit						V
245		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment					V	
246		Poor application of T/O & RTO procedure, braking initiation sequence					٧	
247		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.					٧	
248		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.					٧	
249		Lack of adherence to SOP for approach and landing		V				



	Safety Performance	Ducasinos		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
250		Poor application of T/O & RTO procedure, computation of T/O parameters					٧	
251		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS			V			
252		Flaws in aircraft system maintenance process definition - GPWS system components			٧			
253		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - GPWS system components			٧			
254		Flaws in manufacturer quality control process - GPWS system components			V		l	
131	Rate of excessive approach speed event/approach	Pilot tiredness - Inadequate workload distribution		V	٧	٧		٧
132		Flaws in pilot requirements definition process and/or training methodology		٧	٧	٧		٧
133		Lack of adherence to SOP in terms of approach and landing		V	V			V
134		Flaws in CRM training procedures		V	V			٧
135		Lack of adherence to the main CRM rules		٧	٧			V
136		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties		٧	٧	٧		٧
137		Incorrect use of automation - FMS		V	V			V
138		Unintuitive and / or error prone system manual - FMS		٧	٧			٧
139		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology		٧	٧			V
140		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution		٧	٧			V
141		Traffic controller tiredness - Inadequate workload distribution			V	V		V
142		Flaws in traffic controller requirements definition process and/or training methodology			V	V		V
143		Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing		V				V
144		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.		٧	٧			٧
145		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path		٧				٧
146		Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport in the case of adverse weather.		٧				٧
147		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)			٧	٧		
148		Altimeter setting error			٧	V		
149		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components			٧	V		
150		Flaws in manufacturer quality control process - Onboard navigational systems and components.			V	V		



	Safety Performance	Dura susura se		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
151		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)			V	V		
152		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)			V	V		
153		Lack of adherence to emergency procedures - control recovery		٧				٧
154		Lack of English proficiency			V	V		
155		Use of non-standard phraseology by pilot and/or controller			V	V		
156		Lack of or poor communication quality			V	V		
157		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver			V	V		
158		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).			V			٧
159		Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure		٧				V
160		Aggressive maneuvering / overcontrolling		٧				٧
161		Lack of adherence to the SOP in terms of critical indicators cross-checking			V			
162		Failure to check navigation accuracy before approach			V			
163		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. Navigational aid failure.			V			
164		Not recognized ground Navaids System failure not reflected in NOTAM messages			V			
165		High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,)		V				V
166		Late deceleration and configuration set-up for approach and landing		٧				V
167		Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS)			V			
168		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS)			V			
169		Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS)			V			
170		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.			V			
171		Current airport diagram not reflecting critical changes			V			
172		Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination			V			
173		Lack of adherence to SOP for AIR operations in terms of controller error in approach clearence instruction			V			
174		Unstabilized final approach (high, fast, steep,)		V			<u> </u>	V
175		Lack of adherence to SOP for take-off procedure in terms of altimeter callibration.				V		
176		Incorrect or confusing / misleading ATC instructions				V		



	Safety Performance	Discourse and the state of the		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
177		Hearback ommitted				V		
178		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.				V		
179		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.				٧		
180		Flaws in manufacturer quality control process - Communication equipment systems and components.				V		
181		Lack of adherence to Rules of the Air - adherence to Controller clearance				٧		
182		Tactical or / and Planning Controller tiredness - Inadequate workload distribution				V		
183		Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology				V		
184		Unintuitive and / or error prone system manual - communication equipment.				V		
185		Altitude deviation				V		
186		Level bust (pilot lapse or late re-clearance by ATC)				V		
187		Failure to comply with an altitude or speed restriction / constraint				V		
188		Navigation deviation				V		
189		Inadequate coordination between ATM centers and/or ATC sectors				V		
190		Flaws in Airspace and Air Traffic planning procedures design process				V		
191		Flaws in conflict and separation minima infringement detection / elimination procedures				V		
192		Lack of adherence of airlines to time contraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data.				٧		
193		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MTCD System				٧		
194		Lack of adherence of airlines to declared Flight Plan.				٧		
195		Failure to identify the pre-tactical conflict before it reach the tactical controller				V		
196		Lack of adherence to SOP for Airborne operation in terms of minimum seprataion				V		
197		Incorrect use of communication equipment				V		
198		Military activity in controlled airport or located within controlled area				V		
199		General aviation activity in controlled airport or located within controlled area				V		
200		Intensified traffic related to general aviation activity e. g. over GA airport / airfield				V		
201		Deviation from flight trajectory commanded by controller				V		
202		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		٧				V



	Safety Performance	Precursors		Op	eration	al issu	e	
No.	Indicators	Precuisors	1	2	3	4	5	6
203		DME / ILS DME confusion in assessing the final descent point / FAF		V				V
204		Flaws in manufacturer quality control process - Fire extinguishing system components				V		
205		Imbalanced and inaproppriate relation between cpt and his subordinates			٧			
206		Descent above desired descent profile		٧				٧
207		Lack of adherence to AFM limitations for landing		٧				٧
208		Unintuitive and / or error prone system manual - CPCS						٧
209		Tailwind component above limit						٧
210		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of STCA System.				V		
211		Lack of adherence to regulations concerning independent ATCO monitoring				V		
212		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - STCA System				V		
213		Go-around attempt after thrust reversers deployment		V				٧
214		Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared						٧
215		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System.						٧
216		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system						٧
217		Flaws in manufacturer quality control process - PWS system components						V
218		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.						٧
219		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - LLWAS system						٧
220		Late activation of pedal braking or takeover from autobrake, when so required		V				٧
221		Delayed selection of reverse thrust		V				٧
222		Inappropriate selection of autobrake mode for given runway length and condition		٧				٧
223		Lack of adherence to emergency procedures - WEM						٧
224		Failure to remember / assess crosswind component limit for prevailing runway condition						٧
225		Inadequate crosswind landing / decrab technique						V
226		Touchdown off centerline						V
227		Inappropriate use of differential reverse thrust						٧
228		Inadequate use of differential braking						V
229		Use of nose wheel steering tiller during rollout						V



	Safety Performance	December		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
230		Flaws in manufacturer quality control process - Landing gear components.		V				
231		Flaws in aircraft system maintenance process definition - Landing gear components.		V				
232		Long / floating flare						٧
233		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum		V				٧
234		Failure to arm ground-spoilers		V				V
235		Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain)			V			
236		Premature descent to DA(H) before G/S intercept or premature descent to MDA(H) before final-descent-point / FAF			V			
237		Premature descent below MDA(H) before reaching the visual-descent-point (VDP)			V			
238		Flight below desired flight path during initial and/or final approach			V			
239		Continued approach, when below DA(H) or MDA(H), after loss of visual references			V			
240		Late or inadequate response to MSAW warning			٧			
241		Failure to go-around, when so required			٧			
242		Failure to follow published missed-approach procedure			٧			
243		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of MSAW system.			V			
244		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MSAW System			٧			
245		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. MSAW warning.			V			
246		Late thrust reduction or power-on touchdown		V				٧
247		Error in calculation of necessary amount of fuel		V				٧
248		Lack of adherence to SOP in terms of necessary amount of fuel		V				٧
249		Lack of adherence to SOP for approach and landing		٧				
250		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ACAS system components				V		
251		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS			V			
252		Inappropriate visual avoidance maneuver				V		
253		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ACAS installed on aircraft.				V		
254		Late or inadequate response to ACAS warning				V		
255		Flaws in aircraft system maintenance process definition - GPWS system components			V			



	Safety Performance	Precursors		Оре	erationa	al issu	е	
N	o. Indicators	FIECUISOIS	1	2	3	4	5	6
25	6	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance			V			
		with requirements - GPWS system components			-			ı
25	7	Flaws in manufacturer quality control process - GPWS system components			٧			



	Safety Performance	Duranturana		Opi	eration	al issu	e	$\neg \neg$
No.	Indicators	Precursors	1	2	3	4	5	6
	ORGANISATION	Deviations: procedural or flight path	GCOL	LOC-I	CFIT	MAC	RE-TO	RE-L
131	Rate of unstable approaches/landing	Pilot tiredness - Inadequate workload distribution		V	V		V	V
132		Flaws in pilot requirements definition process and/or training methodology		V	V		٧	V
133		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology		V	V		V	V
134		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution		V	V		V	V
135		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties		V	V			V
136		Lack of adherence to SOP in terms of approach and landing		V	V			V
137		Incorrect use of automation - FMS		V	V			V
138		Unintuitive and / or error prone system manual - FMS		V	V			٧
139		Flaws in CRM training procedures		V	V			٧
140		Lack of adherence to the main CRM rules		V	V			V
141		Lack of adherence to the SOP in terms of critical indicators cross-checking		V	V			
142		Aggressive maneuvering / overcontrolling		V				V
143		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		V			٧	V
144		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.		V	V			V
145		Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather.		V				V
146		Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing		V				V
147		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path		V				V
148		Inadequate aircraft de-icing / anti-icing		V			V	
149		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.		V			V	
150		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.		V			V	
151		Flaws in aircraft system maintenance process definition - Components of Wing control surface system.		V	<u></u>		٧	
152		Flaws in manufacturer quality control process - Components of Wing control surface system.		V			V	



	Safety Performance	Discourse.		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
153		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring		V				
154		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)		٧	٧		V	
155		Flaws in traffic controller requirements definition process and/or training methodology			٧			V
156		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).			>			V
157		Lack of adherence to SOP in terms of AFM limitations		V			l	
158		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fuel system components		V				
159		Flaws in aircraft system maintenance process definition - Fuel system compoonents		٧				
160		Traffic controller tiredness - Inadequate workload distribution			٧			V
161		Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure		V				V
162		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)		V	٧		V	
163		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Integrity of primary aircraft structure.		V				
164		Flaws in manufacturer quality control process - Integrity of primary aircraft structure.		V				
165		Flaws in manufacturer quality control process - Fuel system components.		V				
166		Flaws in aircraft system maintenance process definition - Landing gear components.		V				
167		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)		V	٧		V	
168		Lack of adherence to emergency procedures - control recovery		٧				V
169		Lack of adherence to SARPs in terms of avoiding adverse weather conditions during flight		V				
170		Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.		٧				
171		Flaws in manufacturer quality control process - Landing gear components.		V				
172		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		V				
173		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine anti-ice systems and / or components		V				
174		Flaws in manufacturer quality control process - Engine anti-ice system and / or components		V				
175		Flaws in aircraft system maintenance process definition - Engine anti-ice system and / or components		V				
176		Incorrect use of automation -Engine anti-ice system		V				
177		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Reduction gear in the engine		V				



	Safety Performance	Discourage	T	Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
178		Flaws in manufacturer quality control process - Reduction gear in the engine.		V				
179		Flaws in aircraft system maintenance process definition - Reduction gear in the engine.		V				1
180		Inadequate de-icing method applied		V				
181		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Compressor in the engine		V				
182		Flaws in manufacturer quality control process - Compressor in the engine.		V				1
183		Flaws in aircraft system maintenance process definition - Compressor in the engine.		V				
184		Flaws in manufacturer quality control process - Engine accessory drive components.		٧				
185		Flaws in aircraft system maintenance process definition - Engine accessory drive components.		V				
186		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine accessory drive components.		V				
187		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ECAM (or similar) system components.		٧				
188		Lack of adherence to emergency procedures - Fuel starvation		V				
189		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components		٧				
190		Flaws in aircraft system maintenance process definition - Oil distribution system		V				
191		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Oil distribution system		٧				
192		Flaws in manufacturer quality control process - Oil distribution system		V				
193		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components			V		٧	
194		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.			٧		V	
195		Flaws in manufacturer quality control process - Onboard navigational systems and components.			٧		V	
196		Lack of or poor communication quality			V		٧	
197		Flaws in aircraft system maintenance process definition - ECAM (or similar) system components.		V				
198		Unintuitive and / or error prone system manual - Engine anti-icing system		٧				
199		Lack of adherence to SOP in terms of de-icing / anti-icing procedures.		V				
200		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ECAM.		٧				
201		Flaws in manufacturer quality control process - ECAM (or similar) system components.		٧				
202		Flaws in aircraft system maintenance process definition - Engine combustor		V				



	Safety Performance	Discourse		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
203		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine combustor		٧				
204		Flaws in manufacturer quality control process - Engine combustor		V				
205		Flaws in aircraft system maintenance process definition - Engine turbine components		V				
206		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine turbine components		٧				
207		Flaws in manufacturer quality control process - Engine turbine components		V				
208		Flaws in manufacturer quality control process - Engine systems and / or components		V				
209		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS)			٧			
210		Failure to check navigation accuracy before approach			V			
211		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. Navigational aid failure.			٧			
212		Not recognized ground Navaids System failure not reflected in NOTAM messages			V			
213		Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS)			V			
214		Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS)			V			
215		Lack of English proficiency			V			
216		Use of non-standard phraseology by pilot and/or controller			V			
217		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver			V			
218		Current airport diagram not reflecting critical changes			V			
219		Altimeter setting error			V			
220		Lack of adherence to SOP for AIR operations in terms of controller error in approach clearence instruction			V			
221		Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination			٧			
222		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components		V			V	
223		Flaws in aircraft system maintenance process definition - APU systems and / or components		V			V	
224		High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,)		V				٧
225		Late deceleration and configuration set-up for approach and landing		٧				٧
226		DME / ILS DME confusion in assessing the final descent point / FAF		V				٧
227		Unstabilized final approach (high, fast, steep,)		V				V



	Safety Performance	December 1		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
228		Imbalanced and inaproppriate relation between cpt and his subordinates			V			
229		Unintuitive and / or error prone system manual - CPCS					V	V
230		Descent above desired descent profile		V				٧
231		Lack of adherence to AFM limitations for landing		٧				٧
232		Lack of adherence to AFM in terms of emergency procedures - engine restart procedure		V				
233		Flaws in manufacturer quality control process - APU systems and / or components		V				
234		Lack of adherence to SOP in terms of awareness on supporting systems warning		V				
235		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine		٧			٧	
236		Flaws in manufacturer quality control process - Autothrottle system in the engine.		V			٧	
237		Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.		V			V	
238		Unintuitive and / or error prone system manual - ECAM		V				
239		Flaws in manufacturer quality control process - Engine sensors		V				
240		Flaws in aircraft system maintenance process definition - Engine sensors		V				
241		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine sensors		٧				
242		Go-around attempt after thrust reversers deployment		V				٧
243		Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared						٧
244		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System.						٧
245		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system						V
246		Flaws in manufacturer quality control process - PWS system components						٧
247		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.						٧
248		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - LLWAS system						V
249		Lack of adherence to emergency procedures - WEM						٧
250		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components					V	
251		Flaws in manufacturer quality control process - Power supply system components					V	
252		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.					٧	
253		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance					V	



	Safety Performance	Dunasyurasya		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
		with requirements - Communication equipment systems and components.						
254		Flaws in manufacturer quality control process - Communication equipment systems and components.					V	
255		Navigation deviation					٧	
256		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components					V	
257		Flaws in aircraft system maintenance process definition - Hydraulic System					V	
258		Tailwind component above limit						V
259		Flaws in aircraft system maintenance process definition - Fire detection system components					V	
260		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components					V	
261		Flaws in manufacturer quality control process - Fire detection system components					V	
262		Flaws in aircraft system maintenance process definition - Fire warning system					V	
263		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system					٧	
264		Flaws in manufacturer quality control process - Fire warning system					٧	
265		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components					٧	
266		Flaws in aircraft system maintenance process definition - Fire extinguishing system components					V	
267		Flaws in manufacturer quality control process - Fire extinguishing system components					V	
268		Flight below maneuvering speeds		V				
269		Error in calculation of necessary amount of fuel		V				V
270		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum		٧			V	V
271		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					V	
272		Poor application of T/O & RTO procedure, failure recognition and preparedness					V	
273		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Rudder components.		٧				
274		Flaws in aircraft system maintenance process definition - Rudder components.		V				
275		Flaws in manufacturer quality control process - Rudder components.		٧				
276		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Horizontal stabilizer components.		V				
277		Flaws in aircraft system maintenance process definition - Horizontal stabilizer components.		V				



	Safety Performance	Draguesara		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
278		Flaws in manufacturer quality control process - Horizontal stabilizer components.		V				
279		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Thrust reverse system in the engine.		V				
280		Flaws in manufacturer quality control process - Thrust reverse system in the engine.		V				
281		Flaws in aircraft system maintenance process definition - Thrust reverse system in the engine.		V				
282		Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain)			V			
283		Premature descent to DA(H) before G/S intercept or premature descent to MDA(H) before final-descent-point / FAF			V			
284		Premature descent below MDA(H) before reaching the visual-descent-point (VDP)			V			
285		Flight below desired flight path during initial and/or final approach			V			
286		Continued approach, when below DA(H) or MDA(H), after loss of visual references			V			
287		Late or inadequate response to MSAW warning			V			
288		Failure to go-around, when so required			V			
289		Failure to follow published missed-approach procedure			V			
290		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of MSAW system.			V			
291		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MSAW System			V			
292		Lack of adherence to the current technology standards in terms of flight safety and efficiency - engines location.		V				
293		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. MSAW warning.			V			
294		Late activation of pedal braking or takeover from autobrake, when so required		V				٧
295		Delayed selection of reverse thrust		V				V
296		Late thrust reduction or power-on touchdown		V				٧
297		Failure to arm ground-spoilers		V				V
298		Inappropriate selection of autobrake mode for given runway length and condition		V				٧
299		Lack of adherence to AFM limitations for Take-off		V				
300		Lack of adherence to SOP in terms of necessary amount of fuel		V				٧
301		Lack of adherence to emergency procedures - recovery from severe FCS failure		V				
302		Lack of adherence to AFM in terms of emergency procedures - engine failure		٧				
303		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine fuel distribution system		٧				
304		Flaws in manufacturer quality control process - Engine fuel distribution system		V				



	Safety Performance	D		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
305		Flaws in aircraft system maintenance process definition - Engine fuel distribution system		V				
306		Incorrect or confusing / misleading ATC instructions			V			
307		Flaws in aircraft system maintenance process definition - stickshaker			V			
308		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment					٧	
309		Poor application of T/O & RTO procedure, braking initiation sequence					٧	
310		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.					٧	
311		Lack of adherence to SOP for approach and landing		٧				
312		Flaws in aircraft system maintenance process definition - Electrical wiring System		٧				
313		Poor application of T/O & RTO procedure, computation of T/O parameters					٧	
314		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS			V			
315		Taxiing without clearance		٧				
316		Flaws in aircraft system maintenance process definition - Engine systems and / or components		V				1
317		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Electrical / wiring system components		V				
318		Flaws in manufacturer quality control process - Electrical / wiring systems components		V				
319		Flaws in aircraft system maintenance process definition - GPWS system components			V			
320		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - GPWS system components			V			
321		Flaws in manufacturer quality control process - GPWS system components			V			
131	Rate of deep landings/landing	Pilot tiredness - Inadequate workload distribution		V	V	V		٧
132		Flaws in pilot requirements definition process and/or training methodology		٧	V	V		V
133		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties		V	V	V		٧
134		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology		V	V			V
135		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution		V	V			V
136		Lack of adherence to SOP in terms of approach and landing		٧	V			V
137		Incorrect use of automation - FMS		٧	V			٧
138		Unintuitive and / or error prone system manual - FMS		٧	V			V
139		Flaws in CRM training procedures		٧	V			V



	Safety Performance	Dragueses		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
140		Lack of adherence to the main CRM rules		٧	V			V
141		Lack of adherence to the SOP in terms of critical indicators cross-checking		V	V			
142		Aggressive maneuvering / overcontrolling		V				V
143		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.		٧	V			٧
144		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path		٧				٧
145		Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing		٧				V
146		Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport in the case of adverse weather.		V				V
147		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)			V	V		
148		Traffic controller tiredness - Inadequate workload distribution			V	V		
149		Flaws in traffic controller requirements definition process and/or training methodology			V	V		
150		Altimeter setting error			V	V		
151		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		٧				٧
152		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components			V	V		
153		Flaws in manufacturer quality control process - Onboard navigational systems and components.			V	V		
154		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)			V	V		
155		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)			V	V		
156		Lack of English proficiency			V	V		
157		Use of non-standard phraseology by pilot and/or controller			V	V		
158		Lack of or poor communication quality			V	V		
159		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver			V	V		
160		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.		V				
161		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring		V				
162		Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure		٧				٧
163		Inadequate aircraft de-icing / anti-icing		V				
164		Lack of adherence to SOP in terms of AFM limitations		V				
165		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance		V				



	Safety Performance	Precursors		Ор	eration	al issu	e	
No.	Indicators	Precuisors	1	2	3	4	5	6
		with requirements - Integrity of primary aircraft structure.						
166		Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.		V				
167		Flaws in manufacturer quality control process - Integrity of primary aircraft structure.		V				
168		Flaws in manufacturer quality control process - Landing gear components.		V				
169		Flaws in aircraft system maintenance process definition - Landing gear components.		٧				
170		Lack of adherence to emergency procedures - control recovery		٧				٧
171		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		٧				
172		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fuel system components		٧				
173		Flaws in aircraft system maintenance process definition - Fuel system compoonents		V				
174		Lack of adherence to SARPs in terms of avoiding adverse weather conditions during flight		٧				
175		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Reduction gear in the engine		٧				
176		Flaws in manufacturer quality control process - Reduction gear in the engine.		V				
177		Flaws in aircraft system maintenance process definition - Reduction gear in the engine.		٧				
178		Flaws in manufacturer quality control process - Fuel system components.		٧				
179		Incorrect use of automation -Engine anti-ice system		V				
180		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Compressor in the engine		٧				
181		Flaws in manufacturer quality control process - Compressor in the engine.		٧				
182		Flaws in aircraft system maintenance process definition - Compressor in the engine.		٧				
183		Flaws in manufacturer quality control process - Engine accessory drive components.		V				
184		Flaws in aircraft system maintenance process definition - Engine accessory drive components.		V				
185		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine accessory drive components.		٧				
186		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine anti-ice systems and / or components		٧				
187		Flaws in manufacturer quality control process - Engine anti-ice system and / or components		٧				
188		Flaws in aircraft system maintenance process definition - Engine anti-ice system and / or components		٧				
189		Flaws in aircraft system maintenance process definition - Oil distribution system		V				
190		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance		٧				



	Safety Performance	December		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
		with requirements - Oil distribution system						
191		Flaws in manufacturer quality control process - Oil distribution system		V				
192		Lack of adherence to emergency procedures - Fuel starvation		٧				
193		Inadequate de-icing method applied		٧				
194		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ECAM (or similar) system components.		V				
195		Flaws in aircraft system maintenance process definition - ECAM (or similar) system components.		V				
196		Unintuitive and / or error prone system manual - Engine anti-icing system		V				
197		Lack of adherence to SOP in terms of de-icing / anti-icing procedures.		V				
198		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ECAM.		V				
199		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.		٧				
200		Flaws in aircraft system maintenance process definition - Components of Wing control surface system.		V				1
201		Flaws in manufacturer quality control process - Components of Wing control surface system.		V				
202		Flaws in manufacturer quality control process - ECAM (or similar) system components.		V				
203		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components		V				
204		Flaws in aircraft system maintenance process definition - Engine combustor		V				1
205		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine combustor		V				
206		Flaws in manufacturer quality control process - Engine combustor		٧				
207		Flaws in aircraft system maintenance process definition - Engine turbine components		V				
208		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine turbine components		٧				
209		Flaws in manufacturer quality control process - Engine turbine components		V				1
210		Flaws in manufacturer quality control process - Engine systems and / or components		V				
211		Failure to check navigation accuracy before approach			V			
212		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. Navigational aid failure.			٧			
213		Not recognized ground Navaids System failure not reflected in NOTAM messages			٧			
214		Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS)			V			
215		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance			V			



216 217 218	dicators	with requirements - Ground navigational systems and components (e.g. ILS) Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS) Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).	1	2	3 V V	4	5	6
217		Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS) Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).			,			
217		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).			,			
218		with requirements - Onboard navigational systems and components. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).			V			
		approach path parameters and obstacles locations (e.g. mountains).						
					٧			
219		Current airport diagram not reflecting critical changes			V			
220		Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination			V			
221		Lack of adherence to SOP for AIR operations in terms of controller error in approach clearence instruction			V			
222		Lack of adherence to SOP for take-off procedure in terms of altimeter callibration.				V		
223		Incorrect or confusing / misleading ATC instructions				V		
224		Hearback ommitted				V		
225		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.				V		
226		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.				٧		
227		Flaws in manufacturer quality control process - Communication equipment systems and components.				V		
228		Lack of adherence to Rules of the Air - adherence to Controller clearance				V		
229		Tactical or / and Planning Controller tiredness - Inadequate workload distribution				V		
230		Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology				V		
231		Unintuitive and / or error prone system manual - communication equipment.				V		
232		Altitude deviation				V		
233		Level bust (pilot lapse or late re-clearance by ATC)				V		
234		Failure to comply with an altitude or speed restriction / constraint				V		
235		Navigation deviation				V		
236		Inadequate coordination between ATM centers and/or ATC sectors				V		
237		Flaws in Airspace and Air Traffic planning procedures design process				V		
238		Flaws in conflict and separation minima infringement detection / elimination procedures				V		
239		Lack of adherence of airlines to time contraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data.				V		
240		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance				V		



	Safety Performance	Precursors	Operational issue					
No.	Indicators	FIECUISOIS	1	2	3	4	5	6
		with requirements - MTCD System						
241		Lack of adherence of airlines to declared Flight Plan.				V		
242		Failure to identify the pre-tactical conflict before it reach the tactical controller				V		
243		Lack of adherence to SOP for Airborne operation in terms of minimum seprataion				V		
244		Incorrect use of communication equipment				٧		
245		Military activity in controlled airport or located within controlled area				٧		
246		General aviation activity in controlled airport or located within controlled area				٧		
247		Intensified traffic related to general aviation activity e. g. over GA airport / airfield				V		
248		Deviation from flight trajectory commanded by controller				V		
249		Flaws in manufacturer quality control process - Fire extinguishing system components				V		
250		Imbalanced and inaproppriate relation between cpt and his subordinates			V			
251		Lack of adherence to AFM in terms of emergency procedures - engine restart procedure		V				
252		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components		٧				
253		Flaws in manufacturer quality control process - APU systems and / or components		V				
254		Flaws in aircraft system maintenance process definition - APU systems and / or components		V				
255		Lack of adherence to SOP in terms of awareness on supporting systems warning		V				
256		Unintuitive and / or error prone system manual - ECAM		V				
257		Descent above desired descent profile		V				٧
258		High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,)		V				٧
259		Late deceleration and configuration set-up for approach and landing		٧				٧
260		DME / ILS DME confusion in assessing the final descent point / FAF		٧				V
261		Unstabilized final approach (high, fast, steep,)		V				٧
262		Flaws in manufacturer quality control process - Engine sensors		V				
263		Flaws in aircraft system maintenance process definition - Engine sensors		٧				
264		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine sensors		V				
265		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of STCA System.				V		
266		Lack of adherence to regulations concerning independent ATCO monitoring				V		_



	Safety Performance	Duranina		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
267		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - STCA System				V		
268		Go-around attempt after thrust reversers deployment		V				٧
269		Lack of adherence to AFM limitations for landing		V				٧
270		Error in calculation of necessary amount of fuel		V				٧
271		Unintuitive and / or error prone system manual - CPCS						٧
272		Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain)			V			
273		Premature descent to DA(H) before G/S intercept or premature descent to MDA(H) before final-descent-point / FAF			V			
274		Premature descent below MDA(H) before reaching the visual-descent-point (VDP)			V			
275		Flight below desired flight path during initial and/or final approach			V			
276		Continued approach, when below DA(H) or MDA(H), after loss of visual references			V			
277		Late or inadequate response to MSAW warning			V			
278		Failure to go-around, when so required			V			
279		Failure to follow published missed-approach procedure			V			
280		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of MSAW system.			V			
281		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MSAW System			V			
282		Lack of adherence to the current technology standards in terms of flight safety and efficiency - engines location.		V				
283		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. MSAW warning.			V			
284		Late activation of pedal braking or takeover from autobrake, when so required		٧				٧
285		Delayed selection of reverse thrust		٧				٧
286		Late thrust reduction or power-on touchdown		٧				٧
287		Failure to arm ground-spoilers		٧				٧
288		Inappropriate selection of autobrake mode for given runway length and condition		٧				٧
289		Lack of adherence to AFM limitations for Take-off		V				
290		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum		٧				٧
291		Lack of adherence to SOP in terms of necessary amount of fuel		V				٧
292		Lack of adherence to AFM in terms of emergency procedures - engine failure		V				
293		Lack of adherence to SOP for approach and landing		٧				



	Safety Performance	Dua su usa usa		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
294		Flaws in aircraft system maintenance process definition - Electrical wiring System		٧				
295		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ACAS system components				٧		
296		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS			V			
297		Inappropriate visual avoidance maneuver				V		
298		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ACAS installed on aircraft.				V		
299		Late or inadequate response to ACAS warning				V		1
300		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Electrical / wiring system components		V				
301		Flaws in manufacturer quality control process - Electrical / wiring systems components		V				
302		Flaws in aircraft system maintenance process definition - GPWS system components			V			
303		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - GPWS system components			V			
304		Flaws in manufacturer quality control process - GPWS system components			V			
131	Rate of flight crew failure to deploy ground spoilers/landing	Pilot tiredness - Inadequate workload distribution		V			٧	V
132		Flaws in pilot requirements definition process and/or training methodology		٧			٧	٧
133		Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing		٧				V
134		Lack of adherence to SOP in terms of approach and landing		V				V
135		Flaws in CRM training procedures		V			V	٧
136		Lack of adherence to the main CRM rules		V			V	V
137		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path		V				٧
138		Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport in the case of adverse weather.		V				٧
139		Incorrect use of automation - FMS		V				V
140		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.		V				٧
141		Unintuitive and / or error prone system manual - FMS		V				٧
142		Lack of adherence to emergency procedures - control recovery		V				V



	Safety Performance	Dusannana		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
143		Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure		V				V
144		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties		٧			٧	٧
145		Aggressive maneuvering / overcontrolling		V				V
146		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology		V			V	V
147		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution		V			V	V
148		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		٧			٧	٧
149		High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,)		V				٧
150		Late deceleration and configuration set-up for approach and landing		V				V
151		Unintuitive and / or error prone system manual - CPCS					V	V
152		Descent above desired descent profile		V				V
153		DME / ILS DME confusion in assessing the final descent point / FAF		V				V
154		Unstabilized final approach (high, fast, steep,)		V				V
155		Go-around attempt after thrust reversers deployment		٧				V
156		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					٧	
157		Lack of adherence to AFM limitations for landing		V				V
158		Late activation of pedal braking or takeover from autobrake, when so required		V				V
159		Delayed selection of reverse thrust		V				V
160		Inappropriate selection of autobrake mode for given runway length and condition		V				V
161		Lack of or poor communication quality					V	
162		Poor application of T/O & RTO procedure, braking initiation sequence					V	
163		Poor application of T/O & RTO procedure, failure recognition and preparedness					V	
164		Inadequate aircraft de-icing / anti-icing					V	
165		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components					٧	
166		Flaws in manufacturer quality control process - Power supply system components					V	
167		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.					٧	
168		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.					٧	



	Safety Performance	Duraninana		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
169		Flaws in manufacturer quality control process - Communication equipment systems and components.					٧	
170		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.					V	
171		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)					V	
172		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)					V	
173		Flaws in aircraft system maintenance process definition - Components of Wing control surface system.					V	
174		Flaws in manufacturer quality control process - Components of Wing control surface system.					V	
175		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine					V	
176		Navigation deviation					V	
177		Flaws in manufacturer quality control process - Autothrottle system in the engine.					V	
178		Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.					V	
179		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components					V	
180		Flaws in aircraft system maintenance process definition - Hydraulic System					V	
181		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)					V	
182		Failure to remember / assess crosswind component limit for prevailing runway condition					V	V
183		Inappropriate use of differential reverse thrust						٧
184		Inadequate use of differential braking						٧
185		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components					٧	
186		Flaws in aircraft system maintenance process definition - APU systems and / or components					V	
187		Flaws in aircraft system maintenance process definition - Fire detection system components					V	
188		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components					V	
189		Flaws in manufacturer quality control process - Fire detection system components					V	
190		Flaws in aircraft system maintenance process definition - Fire warning system					V	
191		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system					V	
192		Flaws in manufacturer quality control process - Fire warning system					V	
193		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance					V	



	Safety Performance	Duranina		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
		with requirements - Fire extinguishing system components						
194		Flaws in aircraft system maintenance process definition - Fire extinguishing system components					V	
195		Flaws in manufacturer quality control process - Fire extinguishing system components					٧	
196		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components					V	
197		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.					٧	
198		Flaws in manufacturer quality control process - Onboard navigational systems and components.					V	
199		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum		٧			٧	٧
200		Flaws in manufacturer quality control process - Landing gear components.		V				
201		Flaws in aircraft system maintenance process definition - Landing gear components.		V				
202		Inadequate crosswind landing / decrab technique						V
203		Touchdown off centerline						V
204		Use of nose wheel steering tiller during rollout						V
205		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure					V	
206		Failure to arm ground-spoilers		٧				٧
207		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.					V	
208		Poor application of T/O & RTO procedure, aircraft handling					V	
209		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring					V	
210		Late thrust reduction or power-on touchdown		V				V
211		Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.					V	
212		Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.					٧	
213		Error in calculation of necessary amount of fuel		V				V
214		Lack of adherence to SOP in terms of necessary amount of fuel		V				V
215		Incorrect stab-trim setting					V	
216		Late rejected takeoff decision / initiation					V	
217		Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations					V	
218		Lack of English proficiency					٧	
219		Incorrect or confusing / misleading ATC instructions					V	



	Safety Performance	Duogiugous	Operational issue					
No.	Indicators	Precursors	1	2	3	4	5	6
220		Use of non-standard phraseology by pilot and/or controller					V	
221		Traffic controller tiredness - Inadequate workload distribution					V	
222		Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots					V	
223		Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications					٧	
224		Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.					V	
225		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence					V	
226		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity					٧	
227		Flaws in traffic controller requirements definition process and/or training methodology					V	
228		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver					V	
229		Takeoff without clearance					V	
230		Landing without clearance					٧	
231		Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings					V	
232		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment					V	
233		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake)					٧	
234		Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling					V	
235		Lack of adherence to AFM limitations for Take-off					V	
236		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.					V	
237		Unintuitive and / or error prone system manual - FMC					٧	
238		Undetected incorrect takeoff configuration					٧	
239		Poor application of T/O & RTO procedure, computation of T/O parameters					V	
240		Lack of adherence to Rules of the Air - adherence to Controller clearance					٧	
241		Flaws in Airspace and Air Traffic planning procedures design process					٧	
242		Slow rotation (i.e., low pitch rate)					V	
243		Flaws in airport capacity management process					V	
244		Lack of adherence to SOP for take-off procedure in terms of time limitation for take-off preparation.					V	
245		Lack of adherence to SOP for take-off procedure in terms of speed bug checklist preparation and verification.					V	
246		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance					V	



	Safety Performance	Discourse		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
		with requirements - FCS system or components						
247		Flaws in manufacturer quality control process - FCS system components					V	
248		Flaws in aircraft system maintenance process definition - FCS systems or components					V	
249		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components					٧	
250		Flaws in manufacturer quality control process - Engine systems and / or components					٧	
251		Flaws in aircraft system maintenance process definition - Engine systems and / or components					V	
131	Rate of delayed brake application/landing	Pilot tiredness - Inadequate workload distribution		٧			٧	٧
132		Flaws in pilot requirements definition process and/or training methodology		V			V	V
133		Flaws in CRM training procedures		V			V	V
134		Lack of adherence to the main CRM rules		V			V	V
135		Lack of adherence to SOP in terms of approach and landing		V				V
136		Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing		V				V
137		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path		V				٧
138		Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport in the case of adverse weather.		٧				٧
139		Incorrect use of automation - FMS		V				V
140		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.		V				٧
141		Unintuitive and / or error prone system manual - FMS		V				V
142		Lack of adherence to emergency procedures - control recovery		V				V
143		Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure		V				V
144		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties		٧			٧	٧
145		Aggressive maneuvering / overcontrolling		V				V
146		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology		V			٧	V
147		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution		٧			٧	٧
148		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		V			V	V
149		High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,)		V				V



	Safety Performance	Draguesara		Ор	eration	al issu	<u> </u>	
No.	Indicators	Precursors	1	2	3	4	5	6
		or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,)						
150		Late deceleration and configuration set-up for approach and landing		V				V
151		Unintuitive and / or error prone system manual - CPCS					٧	٧
152		Descent above desired descent profile		V				V
153		DME / ILS DME confusion in assessing the final descent point / FAF		V				V
154		Unstabilized final approach (high, fast, steep,)		V				٧
155		Go-around attempt after thrust reversers deployment		V				٧
156		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					٧	
157		Lack of adherence to AFM limitations for landing		V				٧
158		Late activation of pedal braking or takeover from autobrake, when so required		V				٧
159		Delayed selection of reverse thrust		V				٧
160		Inappropriate selection of autobrake mode for given runway length and condition		V				٧
161		Lack of or poor communication quality					V	
162		Poor application of T/O & RTO procedure, braking initiation sequence					V	
163		Poor application of T/O & RTO procedure, failure recognition and preparedness					٧	
164		Inadequate aircraft de-icing / anti-icing					٧	
165		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components					٧	
166		Flaws in manufacturer quality control process - Power supply system components					٧	
167		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.					V	
168		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.					V	
169		Flaws in manufacturer quality control process - Communication equipment systems and components.					٧	
170		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.					V	
171		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)					V	
172		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)					٧	
173		Flaws in aircraft system maintenance process definition - Components of Wing control surface system.					٧	
174		Flaws in manufacturer quality control process - Components of Wing control surface system.					V	



	Safety Performance	Descriptions		Ор	eration	al issu	<u></u>	
No.	Indicators	Precursors	1	2	3	4	5	6
175		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine					V	
176		Navigation deviation					V	
177		Flaws in manufacturer quality control process - Autothrottle system in the engine.					٧	
178		Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.					٧	
179		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components					V	
180		Flaws in aircraft system maintenance process definition - Hydraulic System					V	
181		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)					V	
182		Failure to remember / assess crosswind component limit for prevailing runway condition					V	٧
183		Inappropriate use of differential reverse thrust						٧
184		Inadequate use of differential braking						٧
185		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components					V	
186		Flaws in aircraft system maintenance process definition - APU systems and / or components					V	
187		Flaws in aircraft system maintenance process definition - Fire detection system components					٧	
188		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components					V	
189		Flaws in manufacturer quality control process - Fire detection system components					V	
190		Flaws in aircraft system maintenance process definition - Fire warning system					V	
191		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system					V	
192		Flaws in manufacturer quality control process - Fire warning system					٧	
193		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components					V	
194		Flaws in aircraft system maintenance process definition - Fire extinguishing system components					V	
195		Flaws in manufacturer quality control process - Fire extinguishing system components					V	
196		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components					٧	
197		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.					V	
198		Flaws in manufacturer quality control process - Onboard navigational systems and components.					V	
199		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice		V			V	V



	Safety Performance	Droguesars		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
		presence / or runway surface friction rate below minimum						1
200		Flaws in manufacturer quality control process - Landing gear components.		V				1
201		Flaws in aircraft system maintenance process definition - Landing gear components.		V				
202		Inadequate crosswind landing / decrab technique						V
203		Touchdown off centerline						V
204		Use of nose wheel steering tiller during rollout						V
205		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure					V	
206		Failure to arm ground-spoilers		V				٧
207		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.					٧	
208		Poor application of T/O & RTO procedure, aircraft handling					٧	
209		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring					٧	
210		Late thrust reduction or power-on touchdown		V				٧
211		Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.					V	1
212		Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.					٧	
213		Error in calculation of necessary amount of fuel		V				V
214		Lack of adherence to SOP in terms of necessary amount of fuel		V				٧
215		Incorrect stab-trim setting					٧	
216		Late rejected takeoff decision / initiation					V	
217		Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations					٧	
218		Lack of English proficiency					٧	
219		Incorrect or confusing / misleading ATC instructions					٧	
220		Use of non-standard phraseology by pilot and/or controller					V	
221		Traffic controller tiredness - Inadequate workload distribution					V	
222		Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots					V	
223		Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications					V	
224		Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.					٧	
225		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence					٧	



	Safety Performance	Discourse		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
226		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity					V	
227		Flaws in traffic controller requirements definition process and/or training methodology					V	
228		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver					V	
229		Takeoff without clearance					V	
230		Landing without clearance					V	
231		Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings					V	
232		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment					V	
233		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake)					V	
234		Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling					V	
235		Lack of adherence to AFM limitations for Take-off					V	
236		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.					V	
237		Unintuitive and / or error prone system manual - FMC					V	
238		Lack of adherence to SOP for approach and landing		٧				
239		Undetected incorrect takeoff configuration					V	
240		Poor application of T/O & RTO procedure, computation of T/O parameters					V	
241		Lack of adherence to Rules of the Air - adherence to Controller clearance					V	
242		Flaws in Airspace and Air Traffic planning procedures design process					V	
243		Slow rotation (i.e., low pitch rate)					V	
244		Flaws in airport capacity management process					V	
245		Lack of adherence to SOP for take-off procedure in terms of time limitation for take-off preparation.					V	
246		Lack of adherence to SOP for take-off procedure in terms of speed bug checklist preparation and verification.					V	
247		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FCS system or components					V	
248		Flaws in manufacturer quality control process - FCS system components					V	
249		Flaws in aircraft system maintenance process definition - FCS systems or components					٧	
250		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components					V	
251		Flaws in manufacturer quality control process - Engine systems and / or components					V	l



	Safety Performance	Precursors		V V V V V V V V V V V V V V V V V V V				
No.	Indicators	Precursors	1	2	3	4	5	6
252		Flaws in aircraft system maintenance process definition - Engine systems and / or components					V	1
131	Rate of delayed application of thrust reversers/landing	Pilot tiredness - Inadequate workload distribution		٧			V	V
132		Flaws in pilot requirements definition process and/or training methodology		٧			V	٧
133		Flaws in CRM training procedures		V			V	٧
134		Lack of adherence to the main CRM rules		٧			V	٧
135		Lack of adherence to SOP in terms of approach and landing		٧				٧
136		Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing		V				V
137		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path		٧				V
138		Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport in the case of adverse weather.		V				V
139		Incorrect use of automation - FMS		٧				٧
140		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.		V				V
141		Unintuitive and / or error prone system manual - FMS		٧				٧
142		Lack of adherence to emergency procedures - control recovery		٧				V
143		Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure		٧				V
144		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties		V			V	٧
145		Aggressive maneuvering / overcontrolling		٧				V
146		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology		٧			V	V
147		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution		V			V	V
148		High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,)		V				V
149		Late deceleration and configuration set-up for approach and landing		٧				V
150		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		V			V	٧
151		Descent above desired descent profile		٧				٧
152		DME / ILS DME confusion in assessing the final descent point / FAF		٧				٧
153		Unstabilized final approach (high, fast, steep,)		٧				٧
154		Go-around attempt after thrust reversers deployment		٧				V



	Safety Performance	Duraninana		Operational issue 2				
No.	Indicators	Precursors	1	2	3	4	5	6
155		Lack of adherence to AFM limitations for landing		V				V
156		Unintuitive and / or error prone system manual - CPCS					V	V
157		Late activation of pedal braking or takeover from autobrake, when so required		V				V
158		Delayed selection of reverse thrust		V				٧
159		Inappropriate selection of autobrake mode for given runway length and condition		V				V
160		Poor application of T/O & RTO procedure, braking initiation sequence					V	
161		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					V	
162		Failure to remember / assess crosswind component limit for prevailing runway condition					V	٧
163		Inappropriate use of differential reverse thrust						V
164		Inadequate use of differential braking						٧
165		Flaws in manufacturer quality control process - Landing gear components.		V				
166		Flaws in aircraft system maintenance process definition - Landing gear components.		V				
167		Inadequate crosswind landing / decrab technique						V
168		Touchdown off centerline						٧
169		Use of nose wheel steering tiller during rollout						V
170		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum		٧			V	٧
171		Poor application of T/O & RTO procedure, failure recognition and preparedness					V	
172		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure					V	
173		Failure to arm ground-spoilers		٧				٧
174		Poor application of T/O & RTO procedure, aircraft handling					V	
175		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring					V	
176		Lack of or poor communication quality					V	
177		Late thrust reduction or power-on touchdown		V				٧
178		Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.					٧	
179		Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.					٧	
180		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.					V	
181		Error in calculation of necessary amount of fuel		٧				V



	Safety Performance	Dragiusaus		Op	eration	al issu	е	
No.	Indicators	Precursors	1	2	3	4	5	6
182		Lack of adherence to SOP in terms of necessary amount of fuel		٧				٧
183		Incorrect stab-trim setting					V	
184		Late rejected takeoff decision / initiation					٧	
185		Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations					٧	1
186		Lack of English proficiency					V	
187		Incorrect or confusing / misleading ATC instructions					V	
188		Use of non-standard phraseology by pilot and/or controller					V	
189		Traffic controller tiredness - Inadequate workload distribution					V	
190		Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots					٧	
191		Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications					٧	
192		Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.					V	
193		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence					٧	
194		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity					V	
195		Flaws in traffic controller requirements definition process and/or training methodology					٧	
196		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver					V	
197		Takeoff without clearance					٧	
198		Landing without clearance					V	
199		Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings					V	
200		Inadequate aircraft de-icing / anti-icing					V	
201		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake)					V	
202		Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling					٧	1
203		Lack of adherence to AFM limitations for Take-off					٧	
204		Unintuitive and / or error prone system manual - FMC					V	
205		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components					V	
206		Flaws in manufacturer quality control process - Power supply system components					٧	
207		Lack of adherence to SOP for approach and landing		٧				



	Safety Performance	Decourage	T	Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
208		Undetected incorrect takeoff configuration					٧	
209		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.					V	
210		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.					V	
211		Flaws in manufacturer quality control process - Communication equipment systems and components.					V	
212		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.					V	
213		Lack of adherence to Rules of the Air - adherence to Controller clearance					V	
214		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)					V	
215		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)					V	
216		Flaws in aircraft system maintenance process definition - Components of Wing control surface system.					V	
217		Flaws in manufacturer quality control process - Components of Wing control surface system.					V	
218		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine					٧	
219		Navigation deviation					V	
220		Flaws in Airspace and Air Traffic planning procedures design process					V	
221		Flaws in manufacturer quality control process - Autothrottle system in the engine.					V	
222		Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.					V	
223		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components					V	
224		Flaws in aircraft system maintenance process definition - Hydraulic System					V	
225		Slow rotation (i.e., low pitch rate)					V	
226		Flaws in airport capacity management process					V	
227		Lack of adherence to SOP for take-off procedure in terms of time limitation for take-off preparation.					V	
228		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)	1				V	
229		Lack of adherence to SOP for take-off procedure in terms of speed bug checklist preparation and verification.	1				V	
230		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FCS system or components					V	
231		Flaws in manufacturer quality control process - FCS system components					V	
232		Flaws in aircraft system maintenance process definition - FCS systems or components	1				V	



	Safety Performance	Discourage		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
233		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components					٧	
234		Flaws in manufacturer quality control process - Engine systems and / or components					٧	
235		Flaws in aircraft system maintenance process definition - Engine systems and / or components					V	
236		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components					V	
237		Flaws in aircraft system maintenance process definition - APU systems and / or components					V	<u> </u>
238		Flaws in aircraft system maintenance process definition - Fire detection system components					٧	
239		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components					٧	
240		Flaws in manufacturer quality control process - Fire detection system components					V	<u>L</u>
241		Flaws in aircraft system maintenance process definition - Fire warning system					V	
242		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system					٧	
243		Flaws in manufacturer quality control process - Fire warning system					٧	
244		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components					٧	
245		Flaws in aircraft system maintenance process definition - Fire extinguishing system components					٧	
246		Flaws in manufacturer quality control process - Fire extinguishing system components					V	
247		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components					V	
248		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.					٧	
249		Flaws in manufacturer quality control process - Onboard navigational systems and components.					٧	
131	Rate of level-busts/flight	Pilot tiredness - Inadequate workload distribution		V	V	V	V	٧
132		Flaws in pilot requirements definition process and/or training methodology		V	٧	V	V	V
133		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology		٧	V	V	V	V
134		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution		V	V	V	V	V
135		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties		V	٧	٧		٧
136		Lack of adherence to SOP in terms of approach and landing		٧	٧			٧
137		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.		٧			٧	
138		Lack of adherence to the SOP in terms of critical indicators cross-checking		V	V			



	Safety Performance	Descriptions		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
139		Incorrect use of automation - FMS		V	V			٧
140		Unintuitive and / or error prone system manual - FMS		V	V			٧
141		Flaws in CRM training procedures		V	V			٧
142		Lack of adherence to the main CRM rules		V	٧			٧
143		Traffic controller tiredness - Inadequate workload distribution		V	٧	V		
144		Flaws in traffic controller requirements definition process and/or training methodology		V	V	V	 	
145		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		V			٧	V
146		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components		V			٧	
147		Aggressive maneuvering / overcontrolling		V			<u> </u>	V
148		Flaws in manufacturer quality control process - Engine systems and / or components		V			V	
149		Inadequate aircraft de-icing / anti-icing		V			V	
150		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)		V	V	٧	٧	
151		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fuel system components		V				
152		Flaws in aircraft system maintenance process definition - Fuel system compoonents		V			1	
153		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)		V	V	V	V	
154		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)		V	٧	V	V	
155		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring		٧			V	
156		Lack of or poor communication quality			V	V	٧	
157		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		V			٧	
158		Lack of English proficiency		V	٧	V		
159		Use of non-standard phraseology by pilot and/or controller		V	V	V	1	
160		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components			٧	٧	٧	
161		Flaws in manufacturer quality control process - Onboard navigational systems and components.			V	٧	V	
162		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver			V	٧		
163		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.		V	V			V
164		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance		V				



	Safety Performance	Precursors		Ор	eration	al issu	e	
No.	Indicators	Precuisors	1	2	3	4	5	6
		with requirements - Integrity of primary aircraft structure.						
165		Flaws in manufacturer quality control process - Integrity of primary aircraft structure.		٧				
166		Lack of adherence to SOP in terms of de-icing / anti-icing procedures.		٧				
167		Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport in the case of adverse weather.		V				V
168		Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.		V				
169		Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing		V				٧
170		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path		V				V
171		Lack of adherence to SARPs in terms of avoiding adverse weather conditions during flight		V				
172		Altimeter setting error			V	٧		
173		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.		V			V	
174		Flaws in aircraft system maintenance process definition - Components of Wing control surface system.		V	l		V	ĺ
175		Flaws in manufacturer quality control process - Components of Wing control surface system.		٧			V	
176		Lack of adherence to emergency procedures - control recovery		V				٧
177		Lack of adherence to SOP in terms of AFM limitations		٧				
178		Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure		V				٧
179		Flaws in manufacturer quality control process - Fuel system components.		V				
180		Flaws in manufacturer quality control process - Landing gear components.		V				
181		Flaws in aircraft system maintenance process definition - Landing gear components.		V				
182		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components		V			V	
183		Flaws in aircraft system maintenance process definition - APU systems and / or components		V			V	
184		Flaws in aircraft system maintenance process definition - Engine systems and / or components		V			٧	
185		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine anti-ice systems and / or components		V				
186		Flaws in manufacturer quality control process - Engine anti-ice system and / or components		V				
187		Flaws in aircraft system maintenance process definition - Engine anti-ice system and / or components		V	_ 			
188		Incorrect use of automation -Engine anti-ice system		V				
189		Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems		V	V			



	Safety Performance	Discourage		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
		against contamination						1
190		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Reduction gear in the engine		٧				
191		Flaws in manufacturer quality control process - Reduction gear in the engine.		V				
192		Flaws in aircraft system maintenance process definition - Reduction gear in the engine.		V				
193		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.			٧	٧	V	
194		Inadequate de-icing method applied		V				1
195		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Compressor in the engine		٧				
196		Flaws in manufacturer quality control process - Compressor in the engine.		V				
197		Flaws in aircraft system maintenance process definition - Compressor in the engine.		V				
198		Flaws in manufacturer quality control process - Engine accessory drive components.		V				
199		Flaws in aircraft system maintenance process definition - Engine accessory drive components.		V				
200		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine accessory drive components.		٧				
201		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ECAM (or similar) system components.		٧				
202		Lack of adherence to emergency procedures - Fuel starvation		٧				
203		Flaws in aircraft system maintenance process definition - Oil distribution system		V				
204		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Oil distribution system		V				
205		Flaws in manufacturer quality control process - Oil distribution system		V				
206		Unintuitive and / or error prone system manual - CPCS		V			V	٧
207		Flaws in aircraft system maintenance process definition - ECAM (or similar) system components.		V				
208		Unintuitive and / or error prone system manual - Engine anti-icing system		٧				
209		Flaws in manufacturer quality control process - ECAM (or similar) system components.		V				
210		Flaws in manufacturer quality control process - Fire extinguishing system components		٧		V	٧	
211		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ECAM.		٧				
212		Flaws in manufacturer quality control process - APU systems and / or components		٧				
213		Flaws in aircraft system maintenance process definition - Engine combustor		V				



	Safety Performance	Dragueses		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
214		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine combustor		V				
215		Flaws in manufacturer quality control process - Engine combustor		V				
216		Flaws in aircraft system maintenance process definition - Engine turbine components		V				
217		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine turbine components		٧				
218		Flaws in manufacturer quality control process - Engine turbine components		V				
219		Failure to check navigation accuracy before approach			V			
220		Incorrect or confusing / misleading ATC instructions		V		V		
221		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. Navigational aid failure.			V			
222		Not recognized ground Navaids System failure not reflected in NOTAM messages			V			
223		Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS)			V			
224		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS)			V			
225		Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS)			V			
226		Current airport diagram not reflecting critical changes			V			
227		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).			V			
228		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.				V	V	
229		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.				V	V	
230		Flaws in manufacturer quality control process - Communication equipment systems and components.				V	V	
231		Lack of adherence to SOP for AIR operations in terms of controller error in approach clearence instruction			V			
232		Navigation deviation				V	V	
233		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components		٧			٧	
234		Flaws in aircraft system maintenance process definition - Hydraulic System		V			V	
235		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components		٧			V	
236		Flaws in aircraft system maintenance process definition - Fire detection system components		V			V	
237		Flaws in manufacturer quality control process - Fire detection system components		٧			V	
238		Flaws in aircraft system maintenance process definition - Fire warning system		V			V	1



	Safety Performance	Ducativacara		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
239		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system		٧			٧	
240		Flaws in manufacturer quality control process - Fire warning system		V			V	
241		Hearback ommitted				V		
242		Lack of adherence to Rules of the Air - adherence to Controller clearance				V		
243		Flaws in aircraft system maintenance process definition - Electrical wiring System		V				
244		Unintuitive and / or error prone system manual - communication equipment.				V		
245		Altitude deviation				V		
246		Level bust (pilot lapse or late re-clearance by ATC)				V		
247		Incorrect use of communication equipment				V		
248		Separation of structural element / component of the aircraft during take-off or landing		V				
249		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Electrical / wiring system components		٧				
250		Flaws in manufacturer quality control process - Electrical / wiring systems components		V				
251		Lack of adherence to SOP in terms of fuelling procedure		V				
252		Failure to comply with an altitude or speed restriction / constraint				V		
253		Flaws in Airspace and Air Traffic planning procedures design process				V		
254		Deviation from flight trajectory commanded by controller				V		
255		Inadequate maintenance of fire vulnerable aircraft parts or components		V				
256		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements in terms of fire resistance		٧				
257		Lack of adherence to regulations concerning transport of DGR goods		V				
258		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Anti-icing system components		٧				
259		Lack of adherence to engine limitations		V				
260		Lack of adherence to SOP for take-off procedure in terms of altimeter callibration.				V		
261		Flaws in conflict and separation minima infringement detection / elimination procedures				٧		
262		Military activity in controlled airport or located within controlled area				٧		
263		General aviation activity in controlled airport or located within controlled area				٧		
264		Intensified traffic related to general aviation activity e. g. over GA airport / airfield				V		



	Safety Performance	Draguesara		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
265		Tactical or / and Planning Controller tiredness - Inadequate workload distribution				٧		
266		Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology				V		
267		Inadequate coordination between ATM centers and/or ATC sectors				٧		
268		Lack of adherence of airlines to time contraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data.				٧		
269		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MTCD System				٧		
270		Lack of adherence of airlines to declared Flight Plan.				V		
271		Failure to identify the pre-tactical conflict before it reach the tactical controller				٧		
272		Lack of adherence to SOP for Airborne operation in terms of minimum seprataion				V		
273		Flaws in manufacturer quality control process - Anti-icing system components		V				
274		Flaws in aircraft system maintenance process definition - Anti-icing systems components		V				
275		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of fire detection / warning or / and extinguishing system.		٧				
276		Imbalanced and inaproppriate relation between cpt and his subordinates			V			
277		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components		٧			٧	
278		High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,)		٧				٧
279		Late deceleration and configuration set-up for approach and landing		V				٧
280		Unstabilized final approach (high, fast, steep,)		V				٧
281		Flaws in aircraft system maintenance process definition - Fire extinguishing system components		V			V	
282		Lack of adherence to AFM in terms of emergency procedures - engine restart procedure		V				
283		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					V	
284		Poor application of T/O & RTO procedure, failure recognition and preparedness					٧	
285		Lack of adherence to SOP in terms of awareness on supporting systems warning		V				
286		Difference indications of independent aircraft speed / altitude or attitude indicators		٧				
287		Unintuitive and / or error prone system manual - ECAM		٧				
288		Descent above desired descent profile		٧				٧
289		DME / ILS DME confusion in assessing the final descent point / FAF		V				٧
290		Flaws in manufacturer quality control process - Engine sensors		V				ĺ



	Safety Performance	Discourage		Op	eration	al issue	e	
No.	Indicators	Precursors	1	2	3	4	5	6
291		Flaws in aircraft system maintenance process definition - Engine sensors		V				1
292		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine sensors		V				
293		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine		V			V	
294		Flaws in manufacturer quality control process - Autothrottle system in the engine.		V			V	
295		Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.		V			٧	
296		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of STCA System.				V		
297		Lack of adherence to regulations concerning independent ATCO monitoring				V		
298		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - STCA System				V		
299		Lack of adherence to AFM in terms of emergency procedures - fire detection and extinguishing procedure		V				
300		Go-around attempt after thrust reversers deployment		V				٧
301		Lack of adherence to SOP in terms of aircraft icing (condition) monitoring		V				
302		Lack of adherence to AFM limitations for landing		V				٧
303		Lack of adherence to AFM in terms of emergency procedures - stall recovery		V			٧	
304		Excessive pitch attitude		V				
305		Excessive bank angle		V				
306		Inadequate effectivenes of fire extinguishing system		V				
307		Incorrect use of automation - Anti-icing system		V				
308		Unintuitive and / or error prone system manual - Anti-icing system		V				
309		Lack of adherence to SOP in terms of pre-flight inspections -presence of anti-contamination covers on pitot static tube		V				
310		Lack of adherence to SOP in terms of briefing and checklist before initiating of start of taxiing and take-off		V				
311		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Pitot static system components		V				
312		Flaws in manufacturer quality control process - Pitot static system components		V				
313		Flaws in aircraft system maintenance process definition - Pitot static systems components		V				
314		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ADI		V				
315		Flaws in manufacturer quality control process - ADI		V				
316		Flaws in aircraft system maintenance process definition - ADI		V				



	Safety Performance	Durannana		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
317		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ASI		٧				
318		Flaws in manufacturer quality control process - ASI		V				
319		Flaws in aircraft system maintenance process definition - ASI		V				
320		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine fuel distribution system		٧				
321		Flaws in manufacturer quality control process - Engine fuel distribution system		V				
322		Flaws in aircraft system maintenance process definition - Engine fuel distribution system		V				
323		Unintuitive and / or error prone system manual - fire extinguishing system		٧				
324		Lack of adherence to AFM limitations for Take-off		٧				
325		Lack of adherence to SOP in terms of requested information support for other aircraft in terms of adverse weather conditions		٧				
326		Lack of adherence to SOP in terms of application of findings from weather report		V				
327		Lack of adherence to SOP in terms of AFM limitations in terms of weigh and balance		V				
328		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PFD		٧				
329		Flaws in manufacturer quality control process - PFD		V				
330		Flaws in aircraft system maintenance process definition - PFD		V				
331		Incorrect weather report obtained by the flight crew		V				
332		Lack of adherence to SOP in terms of providing flight crew with current weather report		٧				
333		Lack of adherence of passengers to the recommendation: Fasten seat belt while seated		V				
334		Lack of adherence to SOP in terms of "fasten your seat belt" information activation in passenger cabin during flight in turbulence conditions		٧				
335		Lack of adherence to SOP in terms of load sheet preparation and verification		V				1
336		Lack of adherence to emergency procedures - recovery from severe FCS failure		٧				
337		Unintuitive and / or error prone system manual - On-board weather radar.		V				
338		Incorrect use of automation - On-board weather radar		٧				
339		Inadequate airline / regulatory provider policy in terms of aware of the risks related to air travel		٧				
340		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - On-board weather radar		V				
341		Flaws in manufacturer quality control process - On-board weather radar		V				1



	Safety Performance	Discourse		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
342		Flaws in aircraft system maintenance process definition - On-board weather radar		٧				
343		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components					٧	
344		Flaws in manufacturer quality control process - Power supply system components					٧	
345		Lack of adherence to the current technology standards in terms of flight safety and efficiency - fuel tank allocation.		V				
346		Poor application of T/O & RTO procedure, aircraft handling					V	
347		Lack of adherence to SOP in terms of pre-flight inspections - cargo securing quality		V				
348		Error in calculation of necessary amount of fuel		V				V
349		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components		٧				
350		Flaws in aircraft system maintenance process definition - Aircraft door system and / or components		V				
351		Tailwind component above limit						V
352		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FCS system or components		٧				
353		Flaws in manufacturer quality control process - FCS system components		V				
354		Flaws in aircraft system maintenance process definition - FCS systems or components		V				
355		Flaws in manufacturer quality control process - CPCS system and / or components		V				
356		Flaws in aircraft system maintenance process definition - CPCS system and / or components		V				
357		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - CPCS system and / or components		٧				
358		Lack of adherence to SOP for GND movements.		V			l	
359		Flight below maneuvering speeds		V				
360		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum		٧			٧	٧
361		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Rudder components.		٧				
362		Flaws in aircraft system maintenance process definition - Rudder components.		V				
363		Flaws in manufacturer quality control process - Rudder components.		V				
364		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Horizontal stabilizer components.		٧				
365		Flaws in aircraft system maintenance process definition - Horizontal stabilizer components.		V				
366		Flaws in manufacturer quality control process - Horizontal stabilizer components.		V				



	Safety Performance	Duranusana	T	Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
367		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Thrust reverse system in the engine.		٧				
368		Flaws in manufacturer quality control process - Thrust reverse system in the engine.		V				
369		Flaws in aircraft system maintenance process definition - Thrust reverse system in the engine.		V				
370		Lack of adherence to emergency procedures - flight deck smoke procedure		V				
371		Lack of adherence to the SOP in terms of critical maneuvre execution - flare		V				
372		Extreme operation condition / poor maintenance quality / advanced life lenght		V				
373		Long / floating flare						٧
374		Incorrect use of automation - CPCS		V				
375		Poor application of T/O & RTO procedure, braking initiation sequence					V	
376		Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain)			V			
377		Premature descent to DA(H) before G/S intercept or premature descent to MDA(H) before final-descent-point / FAF			V			
378		Premature descent below MDA(H) before reaching the visual-descent-point (VDP)			V			
379		Flight below desired flight path during initial and/or final approach			V			
380		Continued approach, when below DA(H) or MDA(H), after loss of visual references			V			
381		Late or inadequate response to MSAW warning			V			
382		Failure to go-around, when so required			V			
383		Failure to follow published missed-approach procedure			V			
384		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of MSAW system.			V			
385		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MSAW System			V			
386		Lack of adherence to the current technology standards in terms of flight safety and efficiency - engines location.		V				
387		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. MSAW warning.			V			
388		Late activation of pedal braking or takeover from autobrake, when so required		V				٧
389		Delayed selection of reverse thrust		V				٧
390		Late thrust reduction or power-on touchdown		٧				٧
391		Failure to arm ground-spoilers		٧				٧
392		Inappropriate selection of autobrake mode for given runway length and condition		٧				٧
393		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment					V	



	Safety Performance	Data a supra a supra a supra a supra a supra a supra a supra a supra a supra a supra a supra a supra a supra a		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
394		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.					٧	
395		Lack of adherence to SOP in terms of necessary amount of fuel		V				٧
396		Poor application of T/O & RTO procedure, computation of T/O parameters					٧	
397		Lack of adherence to AFM in terms of emergency procedures - engine failure		V				
398		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ACAS system components				٧		
399		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS			V			
400		Inappropriate visual avoidance maneuver				V		
401		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ADI system components				V		
402		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ACAS installed on aircraft.				V		
403		Late or inadequate response to ACAS warning				V		
404		Flaws in aircraft system maintenance process definition - GPWS system components			V			
405		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - GPWS system components			V			
406		Flaws in manufacturer quality control process - GPWS system components			V			
131	Rate of navigation errors which result in a loss of separation with another aircraft/flight	Pilot tiredness - Inadequate workload distribution		V	V	V	٧	٧
132		Flaws in pilot requirements definition process and/or training methodology		V	V	V	V	٧
133		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties		٧	V	V	V	V
134		Flaws in CRM training procedures		V	V		V	٧
135		Lack of adherence to the main CRM rules		V	V		V	٧
136		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology		V	V	V	٧	٧
137		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution		٧	V	V	٧	٧
138		Lack of adherence to SOP in terms of approach and landing		٧	V			٧
139		Incorrect use of automation - FMS		٧	V			٧
140		Unintuitive and / or error prone system manual - FMS		٧	V			٧
141		Traffic controller tiredness - Inadequate workload distribution		٧	V	V	٧	



	Safety Performance	Dura sussa sa		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
142		Flaws in traffic controller requirements definition process and/or training methodology		V	٧	V	V	
143		Lack of or poor communication quality			V	V	٧	
144		Lack of English proficiency		٧	٧	V	٧	
145		Use of non-standard phraseology by pilot and/or controller		V	٧	V	V	
146		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver			٧	V	٧	
147		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.		V	٧			٧
148		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components			V	٧	V	
149		Flaws in manufacturer quality control process - Onboard navigational systems and components.			V	V	٧	
150		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path		V				٧
151		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)			٧	٧	V	
152		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)			٧	V	V	
153		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)			٧	V	V	
154		Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing		V				V
155		Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport in the case of adverse weather.		V				V
156		Altimeter setting error			V	٧		
157		Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure		V				V
158		Lack of adherence to emergency procedures - control recovery		V				V
159		Incorrect or confusing / misleading ATC instructions		V		V	V	
160		Lack of adherence to Rules of the Air - adherence to Controller clearance				V	V	
161		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.			٧	٧	V	
162		Flaws in manufacturer quality control process - Fire extinguishing system components		V		V	V	
163		Flaws in Airspace and Air Traffic planning procedures design process				V	V	
164		Aggressive maneuvering / overcontrolling		V				٧
165		Current airport diagram not reflecting critical changes			٧			
166		Lack of adherence to the SOP in terms of critical indicators cross-checking			٧			
167		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude,			V			



	Safety Performance	December 2		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
		approach path parameters and obstacles locations (e.g. mountains).						
168		Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination			٧			
169		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.				٧	V	
170		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.				V	V	
171		Flaws in manufacturer quality control process - Communication equipment systems and components.				٧	V	
172		Failure to check navigation accuracy before approach			V			
173		Tactical or / and Planning Controller tiredness - Inadequate workload distribution				V		
174		Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology				V		
175		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. Navigational aid failure.			V			
176		Lack of adherence to SOP for AIR operations in terms of controller error in approach clearence instruction			V			
177		Not recognized ground Navaids System failure not reflected in NOTAM messages			V			
178		Navigation deviation				V	V	
179		Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS)			V			
180		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS)			٧			
181		Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS)			V			
182		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components		٧			V	
183		Flaws in aircraft system maintenance process definition - Hydraulic System		٧			٧	
184		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components		٧			٧	
185		Flaws in aircraft system maintenance process definition - APU systems and / or components		٧			V	
186		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components		٧			٧	
187		Unintuitive and / or error prone system manual - CPCS		٧			٧	٧
188		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.		V			٧	
189		Inadequate coordination between ATM centers and/or ATC sectors				V		
190		Flaws in aircraft system maintenance process definition - Fire detection system components		٧			٧	
191		Flaws in manufacturer quality control process - Fire detection system components		V			V	



	Safety Performance	Para a surra a surra a surra a surra a surra a surra a surra a surra a surra a surra a surra a surra a surra a		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
192		Flaws in aircraft system maintenance process definition - Fire warning system		٧			٧	
193		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system		٧			٧	
194		Flaws in manufacturer quality control process - Fire warning system		V			V	
195		Hearback ommitted				٧		
196		Unintuitive and / or error prone system manual - communication equipment.				V		
197		Altitude deviation				V		
198		Level bust (pilot lapse or late re-clearance by ATC)				V		
199		Flaws in conflict and separation minima infringement detection / elimination procedures				V		
200		Lack of adherence of airlines to time contraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data.				٧		
201		Incorrect use of communication equipment				٧		
202		Separation of structural element / component of the aircraft during take-off or landing		٧				
203		Lack of adherence to SOP in terms of fuelling procedure		٧				
204		Flaws in aircraft system maintenance process definition - Electrical wiring System		٧				
205		Failure to comply with an altitude or speed restriction / constraint				V		
206		Deviation from flight trajectory commanded by controller				V		
207		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fuel system components		٧				
208		Inadequate maintenance of fire vulnerable aircraft parts or components		٧				
209		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements in terms of fire resistance		٧				
210		Lack of adherence to regulations concerning transport of DGR goods		٧				
211		Flaws in aircraft system maintenance process definition - Fuel system compoonents		٧				
212		Lack of adherence to engine limitations		٧				
213		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components		٧				
214		Flaws in manufacturer quality control process - Engine systems and / or components		V			1	
215		Flaws in aircraft system maintenance process definition - Engine systems and / or components		٧				
216		Flaws in manufacturer quality control process - APU systems and / or components		٧				
217		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance		٧				



	Safety Performance	December 1		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
		with requirements - Electrical / wiring system components						
218		Flaws in manufacturer quality control process - Electrical / wiring systems components		٧				
219		Lack of adherence to SOP for take-off procedure in terms of altimeter callibration.				٧		
220		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MTCD System				٧		
221		Lack of adherence of airlines to declared Flight Plan.				V		
222		Failure to identify the pre-tactical conflict before it reach the tactical controller				V		
223		Lack of adherence to SOP for Airborne operation in terms of minimum seprataion				V		
224		Military activity in controlled airport or located within controlled area				V		
225		General aviation activity in controlled airport or located within controlled area				V		
226		Intensified traffic related to general aviation activity e. g. over GA airport / airfield				V		
227		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of fire detection / warning or / and extinguishing system.		V				
228		Imbalanced and inaproppriate relation between cpt and his subordinates			V			
229		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components		٧			V	
230		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		٧			٧	٧
231		Flaws in aircraft system maintenance process definition - Fire extinguishing system components		V			V	ł
232		Descent above desired descent profile		V				٧
233		High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,)		٧				٧
234		Late deceleration and configuration set-up for approach and landing		٧				٧
235		DME / ILS DME confusion in assessing the final descent point / FAF		٧				٧
236		Unstabilized final approach (high, fast, steep,)		٧				٧
237		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of STCA System.				V		
238		Lack of adherence to regulations concerning independent ATCO monitoring				V		
239		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - STCA System				٧		
240		Lack of adherence to AFM in terms of emergency procedures - fire detection and extinguishing procedure		V				
241		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		V			V	



	Safety Performance	December		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
242		Go-around attempt after thrust reversers deployment		V				V
243		Lack of adherence to AFM limitations for landing		V				V
244		Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications					٧	
245		Inadequate effectivenes of fire extinguishing system		V				
246		Unintuitive and / or error prone system manual - fire extinguishing system		V				
247		Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.					V	
248		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity					٧	
249		Takeoff without clearance					V	
250		Landing without clearance					٧	
251		Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings					V	
252		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					V	
253		Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots					V	
254		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence					V	
255		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components					٧	
256		Flaws in manufacturer quality control process - Power supply system components					V	
257		Flaws in airport capacity management process					V	
258		Lack of adherence to SOP for take-off procedure in terms of time limitation for take-off preparation.					V	
259		Inadequate aircraft de-icing / anti-icing					V	
260		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.					٧	
261		Flaws in aircraft system maintenance process definition - Components of Wing control surface system.					V	
262		Flaws in manufacturer quality control process - Components of Wing control surface system.					V	
263		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine					٧	
264		Flaws in manufacturer quality control process - Autothrottle system in the engine.					V	
265		Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.					٧	
266		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Integrity of primary aircraft structure.		٧				



No. Indicators Precursors	4	5 V	6
Flaws in manufacturer quality control process - Integrity of primary aircraft structure. V		V	\perp
Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring Late rejected takeoff decision / initiation Flaws in manufacturer quality control process - Landing gear components. Flaws in aircraft system maintenance process definition - Landing gear components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components Flaws in aircraft system maintenance process definition - Aircraft door system and / or components Flaws in manufacturer quality control process - CPCS system and / or components Flaws in aircraft system maintenance process definition - CPCS system and / or components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - CPCS system and / or components Lack of adherence to SOP for GND movements. Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum		V	
Late rejected takeoff decision / initiation Flaws in manufacturer quality control process - Landing gear components. Flaws in aircraft system maintenance process definition - Landing gear components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components Flaws in aircraft system maintenance process definition - Aircraft door system and / or components Flaws in manufacturer quality control process - CPCS system and / or components Flaws in aircraft system maintenance process definition - CPCS system and / or components Flaws in aircraft system maintenance process definition - CPCS system and / or components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - CPCS system and / or components Lack of adherence to SOP for GND movements. Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice Presence / or runway surface friction rate below minimum		٧	
Flaws in manufacturer quality control process - Landing gear components. Flaws in aircraft system maintenance process definition - Landing gear components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components Flaws in aircraft system maintenance process definition - Aircraft door system and / or components Flaws in manufacturer quality control process - CPCS system and / or components Flaws in aircraft system maintenance process definition - CPCS system and / or components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - CPCS system and / or components Lack of adherence to SOP for GND movements. Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice			
Flaws in aircraft system maintenance process definition - Landing gear components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components Flaws in aircraft system maintenance process definition - Aircraft door system and / or components Flaws in manufacturer quality control process - CPCS system and / or components Flaws in aircraft system maintenance process definition - CPCS system and / or components Flaws in aircraft system maintenance process definition - CPCS system and / or components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - CPCS system and / or components Lack of adherence to SOP for GND movements. Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice Presence / or runway surface friction rate below minimum		V	
Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components Flaws in aircraft system maintenance process definition - Aircraft door system and / or components Flaws in manufacturer quality control process - CPCS system and / or components Flaws in aircraft system maintenance process definition - CPCS system and / or components V Flaws in aircraft system maintenance process definition - CPCS system and / or components V Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - CPCS system and / or components Lack of adherence to SOP for GND movements. V Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice V V V V V V V V V V V V V			
with requirements - Aircraft door system and / or components Flaws in aircraft system maintenance process definition - Aircraft door system and / or components Flaws in manufacturer quality control process - CPCS system and / or components Flaws in aircraft system maintenance process definition - CPCS system and / or components Flaws in aircraft system maintenance process definition - CPCS system and / or components V Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - CPCS system and / or components Lack of adherence to SOP for GND movements. V Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum			
Flaws in manufacturer quality control process - CPCS system and / or components Flaws in aircraft system maintenance process definition - CPCS system and / or components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - CPCS system and / or components Lack of adherence to SOP for GND movements. Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum			
Flaws in aircraft system maintenance process definition - CPCS system and / or components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - CPCS system and / or components Lack of adherence to SOP for GND movements. V Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum			
Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - CPCS system and / or components Lack of adherence to SOP for GND movements. Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum			
with requirements - CPCS system and / or components 278 Lack of adherence to SOP for GND movements. V Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum			
279 Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum			
presence / or runway surface friction rate below minimum			
		V	V
Poor application of T/O & RTO procedure, failure recognition and preparedness		٧	
281 Lack of adherence to emergency procedures - flight deck smoke procedure			
Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations		V	
283 Lack of adherence to the SOP in terms of critical maneuvre execution - flare			
284 Extreme operation condition / poor maintenance quality / advanced life lenght			
285 Incorrect use of automation - CPCS			
286 Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain)			
287 Premature descent to DA(H) before G/S intercept or premature descent to MDA(H) before final-descent-point / FAF			
288 Premature descent below MDA(H) before reaching the visual-descent-point (VDP)			
289 Flight below desired flight path during initial and/or final approach			
290 Continued approach, when below DA(H) or MDA(H), after loss of visual references			
291 Late or inadequate response to MSAW warning			
292 Failure to go-around, when so required			
293 Failure to follow published missed-approach procedure			1



	Safety Performance	Precursors		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
294		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of MSAW system.			V			
295		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MSAW System			V			
296		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. MSAW warning.			V			
297		Late activation of pedal braking or takeover from autobrake, when so required		V				٧
298		Delayed selection of reverse thrust		V				٧
299		Late thrust reduction or power-on touchdown		٧				٧
300		Failure to arm ground-spoilers		٧				٧
301		Inappropriate selection of autobrake mode for given runway length and condition		٧				٧
302		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment					٧	
303		Poor application of T/O & RTO procedure, braking initiation sequence					٧	
304		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.					٧	
305		Error in calculation of necessary amount of fuel		٧				٧
306		Lack of adherence to SOP in terms of necessary amount of fuel		٧				٧
307		Poor application of T/O & RTO procedure, computation of T/O parameters					٧	
308		Lack of adherence to SOP for approach and landing		٧				
309		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ACAS system components				V		
310		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS			V			
311		Inappropriate visual avoidance maneuver				V		
312		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ADI system components				V		
313		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ACAS installed on aircraft.				V		
314		Late or inadequate response to ACAS warning				V		
315		Flaws in aircraft system maintenance process definition - GPWS system components			V			
316		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - GPWS system components			V			
317		Flaws in manufacturer quality control process - GPWS system components			V			
131	Rate of incorrect flight crew response to genuine TCAS	Pilot tiredness - Inadequate workload distribution		V	V	V	V	



	Safety Performance	Draguesara		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
	RA warnings/warning		ļ				1	
132		Flaws in pilot requirements definition process and/or training methodology		٧	V	V	V	
133		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology		٧	V	V	٧	
134		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution		٧	٧	V	V	
135		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties		V	V	٧	٧	
136		Traffic controller tiredness - Inadequate workload distribution		V	V	V	V	
137		Flaws in traffic controller requirements definition process and/or training methodology		٧	٧	V	V	
138		Lack of adherence to the SOP in terms of critical indicators cross-checking		٧	٧			
139		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.		V			V	
140		Lack of or poor communication quality			V	V	V	
141		Lack of English proficiency		V	V	V	٧	
142		Use of non-standard phraseology by pilot and/or controller		V	V	V	V	
143		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver			V	V	٧	
144		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fuel system components		V				
145		Flaws in aircraft system maintenance process definition - Fuel system compoonents		V				
146		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)			V	٧	٧	
147		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components		V				
148		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components			V	٧	V	
149		Flaws in manufacturer quality control process - Onboard navigational systems and components.			V	V	V	
150		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)			V	V	V	
151		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)			V	V	V	
152		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Integrity of primary aircraft structure.		V				
153		Flaws in manufacturer quality control process - Integrity of primary aircraft structure.		٧				
154		Flaws in manufacturer quality control process - Engine systems and / or components		٧				
155		Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.		٧				
156		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring		٧			V	



	Safety Performance	December		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
157		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		٧			V	
158		Inadequate aircraft de-icing / anti-icing		V			V	
159		Lack of adherence to SARPs in terms of avoiding adverse weather conditions during flight		V				
160		Altimeter setting error			V	V		
161		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		V			V	
162		Lack of adherence to SOP in terms of AFM limitations		V				
163		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.		٧			٧	
164		Flaws in aircraft system maintenance process definition - Components of Wing control surface system.		V			V	
165		Flaws in manufacturer quality control process - Components of Wing control surface system.		٧			V	
166		Flaws in manufacturer quality control process - Fuel system components.		٧				
167		Aggressive maneuvering / overcontrolling		٧				
168		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components		٧			V	
169		Flaws in aircraft system maintenance process definition - APU systems and / or components		V			V	
170		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine anti-ice systems and / or components		٧				
171		Flaws in manufacturer quality control process - Engine anti-ice system and / or components		V			l	
172		Flaws in aircraft system maintenance process definition - Engine anti-ice system and / or components		V				
173		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.			V	٧	V	
174		Incorrect or confusing / misleading ATC instructions		V		٧	V	
175		Incorrect use of automation -Engine anti-ice system		V				
176		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Reduction gear in the engine		٧				
177		Flaws in manufacturer quality control process - Reduction gear in the engine.		V				
178		Flaws in aircraft system maintenance process definition - Reduction gear in the engine.		٧				
179		Inadequate de-icing method applied		٧				
180		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Compressor in the engine		٧				
181		Flaws in manufacturer quality control process - Compressor in the engine.		V			l	



	Safety Performance	Discourage		Ор	eration	al issu	<u> </u>	
No.	Indicators	Precursors	1	2	3	4	5	6
182		Flaws in aircraft system maintenance process definition - Compressor in the engine.		٧				
183		Flaws in manufacturer quality control process - Engine accessory drive components.		V				
184		Flaws in aircraft system maintenance process definition - Engine accessory drive components.		V				
185		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine accessory drive components.		٧				
186		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ECAM (or similar) system components.		V				
187		Lack of adherence to emergency procedures - Fuel starvation		V				l
188		Flaws in aircraft system maintenance process definition - Oil distribution system		V				1
189		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Oil distribution system		٧				
190		Flaws in manufacturer quality control process - Oil distribution system		٧				1
191		Flaws in aircraft system maintenance process definition - ECAM (or similar) system components.		V				
192		Unintuitive and / or error prone system manual - Engine anti-icing system		V				
193		Lack of adherence to SOP in terms of de-icing / anti-icing procedures.		٧				
194		Flaws in manufacturer quality control process - ECAM (or similar) system components.		٧				
195		Flaws in manufacturer quality control process - Landing gear components.		V				
196		Flaws in aircraft system maintenance process definition - Landing gear components.		V				
197		Flaws in manufacturer quality control process - Fire extinguishing system components		٧		٧	V	
198		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ECAM.		٧				
199		Flaws in Airspace and Air Traffic planning procedures design process				V	٧	
200		Flaws in manufacturer quality control process - APU systems and / or components		V				
201		Flaws in CRM training procedures			V		V	
202		Lack of adherence to the main CRM rules			V		V	
203		Flaws in aircraft system maintenance process definition - Engine combustor		V				
204		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine combustor		V				
205		Flaws in manufacturer quality control process - Engine combustor		V				-
206		Flaws in aircraft system maintenance process definition - Engine turbine components		V				
207		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine turbine components		٧				



	Safety Performance	December		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
208		Flaws in manufacturer quality control process - Engine turbine components		V				
209		Lack of adherence to SOP in terms of approach and landing			V			
210		Lack of adherence to Rules of the Air - adherence to Controller clearance				V	V	
211		Incorrect use of automation - FMS			V			
212		Failure to check navigation accuracy before approach			V			
213		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. Navigational aid failure.			V			
214		Not recognized ground Navaids System failure not reflected in NOTAM messages			V			
215		Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS)			V			
216		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS)			٧			
217		Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS)			٧			
218		Unintuitive and / or error prone system manual - FMS			V			
219		Current airport diagram not reflecting critical changes			V			
220		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).			٧			
221		Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination			V			
222		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.				V	V	
223		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.				٧	V	
224		Flaws in manufacturer quality control process - Communication equipment systems and components.				V	V	
225		Tactical or / and Planning Controller tiredness - Inadequate workload distribution				V		
226		Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology				V		
227		Lack of adherence to SOP for AIR operations in terms of controller error in approach clearence instruction			V			
228		Navigation deviation				V	٧	
229		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components		٧			V	
230		Flaws in aircraft system maintenance process definition - Hydraulic System		V	_		٧	
231		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components		V			V	
232		Inadequate coordination between ATM centers and/or ATC sectors				V	<u></u>	



	Safety Performance	Draguesara		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
233		Flaws in aircraft system maintenance process definition - Fire detection system components		٧			٧	
234		Flaws in manufacturer quality control process - Fire detection system components		V			٧	
235		Flaws in aircraft system maintenance process definition - Fire warning system		٧			٧	
236		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system		٧			٧	
237		Flaws in manufacturer quality control process - Fire warning system		V			٧	
238		Hearback ommitted				V		
239		Flaws in aircraft system maintenance process definition - Electrical wiring System		V				
240		Unintuitive and / or error prone system manual - communication equipment.				V		
241		Altitude deviation				V		
242		Level bust (pilot lapse or late re-clearance by ATC)				V		
243		Flaws in conflict and separation minima infringement detection / elimination procedures				V		
244		Lack of adherence of airlines to time contraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data.				٧		
245		Incorrect use of communication equipment				V		
246		Separation of structural element / component of the aircraft during take-off or landing		V				
247		Flaws in aircraft system maintenance process definition - Engine systems and / or components		V				
248		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Electrical / wiring system components		V				
249		Flaws in manufacturer quality control process - Electrical / wiring systems components		V				
250		Lack of adherence to SOP in terms of fuelling procedure		V				
251		Failure to comply with an altitude or speed restriction / constraint				V		
252		Deviation from flight trajectory commanded by controller				V		
253		Inadequate maintenance of fire vulnerable aircraft parts or components		V				
254		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements in terms of fire resistance		V				
255		Lack of adherence to regulations concerning transport of DGR goods		V				
256		Lack of adherence to engine limitations		٧				
257		Lack of adherence to SOP for take-off procedure in terms of altimeter callibration.				٧		
258		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MTCD System				٧		



	Safety Performance	Drocureore		Op	eration	al issu	е	
No.	Indicators	Precursors	1	2	3	4	5	6
259		Lack of adherence of airlines to declared Flight Plan.				V		
260		Failure to identify the pre-tactical conflict before it reach the tactical controller				V		
261		Lack of adherence to SOP for Airborne operation in terms of minimum seprataion				V		
262		Military activity in controlled airport or located within controlled area				V		
263		General aviation activity in controlled airport or located within controlled area				V		
264		Intensified traffic related to general aviation activity e. g. over GA airport / airfield				V		
265		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of fire detection / warning or / and extinguishing system.		V				
266		Imbalanced and inaproppriate relation between cpt and his subordinates			V			
267		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components		V			V	
268		Unintuitive and / or error prone system manual - CPCS		٧			٧	
269		Flaws in aircraft system maintenance process definition - Fire extinguishing system components		٧			٧	
270		Lack of adherence to AFM in terms of emergency procedures - engine restart procedure		V				
271		Lack of adherence to SOP in terms of awareness on supporting systems warning		٧				
272		Unintuitive and / or error prone system manual - ECAM		٧				
273		Flaws in manufacturer quality control process - Engine sensors		٧				
274		Flaws in aircraft system maintenance process definition - Engine sensors		V				
275		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine sensors		V				
276		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of STCA System.				V		
277		Lack of adherence to regulations concerning independent ATCO monitoring				V		
278		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - STCA System				V		
279		Lack of adherence to AFM in terms of emergency procedures - fire detection and extinguishing procedure		٧				
280		Inadequate effectivenes of fire extinguishing system		٧				
281		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine fuel distribution system		V				
282		Flaws in manufacturer quality control process - Engine fuel distribution system		٧				
283		Flaws in aircraft system maintenance process definition - Engine fuel distribution system		٧				
284		Unintuitive and / or error prone system manual - fire extinguishing system		٧				



	Safety Performance	Precursors		Ор	eration	al issu	e	
No.	Indicators	Precuisors	1	2	3	4	5	6
285		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					٧	
286		Lack of adherence to SOP in terms of requested information support for other aircraft in terms of adverse weather conditions		٧				
287		Lack of adherence to SOP in terms of application of findings from weather report		V				
288		Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots					٧	
289		Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.					V	
290		Landing without clearance					V	
291		Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings					V	
292		Lack of adherence to AFM limitations for Take-off		V				
293		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components					٧	
294		Incorrect weather report obtained by the flight crew		V				
295		Lack of adherence to SOP in terms of providing flight crew with current weather report		V				
296		Flaws in manufacturer quality control process - Power supply system components					V	
297		Flaws in airport capacity management process					V	
298		Unintuitive and / or error prone system manual - On-board weather radar.		V				
299		Incorrect use of automation - On-board weather radar		٧				
300		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - On-board weather radar		٧				
301		Flaws in manufacturer quality control process - On-board weather radar		V				
302		Flaws in aircraft system maintenance process definition - On-board weather radar		٧				
303		Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications					٧	
304		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence					V	
305		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity					٧	
306		Takeoff without clearance					٧	
307		Lack of adherence of passengers to the recommendation: Fasten seat belt while seated		٧				
308		Lack of adherence to SOP in terms of "fasten your seat belt" information activation in passenger cabin during flight in turbulence conditions		V				
309		Lack of adherence to the current technology standards in terms of flight safety and efficiency - fuel tank allocation.		V				



	Safety Performance	Descriptions		Ор	eration	al issu		
No.	Indicators	Precursors	1	2	3	4	5	6
310		Lack of adherence to SOP in terms of AFM limitations in terms of weigh and balance		٧				
311		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine					٧	
312		Flaws in manufacturer quality control process - Autothrottle system in the engine.					٧	
313		Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.					٧	
314		Lack of adherence to SOP for take-off procedure in terms of time limitation for take-off preparation.					٧	
315		Inadequate airline / regulatory provider policy in terms of aware of the risks related to air travel		V				
316		Lack of adherence to SOP in terms of load sheet preparation and verification		V				
317		Late rejected takeoff decision / initiation					٧	
318		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components		٧				
319		Flaws in aircraft system maintenance process definition - Aircraft door system and / or components		V				
320		Lack of adherence to SOP in terms of pre-flight inspections - cargo securing quality		V				
321		Lack of adherence to SOP for GND movements.		V				
322		Poor application of T/O & RTO procedure, failure recognition and preparedness					V	
323		Lack of adherence to AFM in terms of emergency procedures - stall recovery		V				
324		Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations					٧	
325		Lack of adherence to the SOP in terms of critical maneuvre execution - flare		V				
326		Extreme operation condition / poor maintenance quality / advanced life lenght		V				
327		Error in calculation of necessary amount of fuel		V				
328		Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain)			V			
329		Premature descent to DA(H) before G/S intercept or premature descent to MDA(H) before final-descent-point / FAF			V			
330		Premature descent below MDA(H) before reaching the visual-descent-point (VDP)			V			
331		Flight below desired flight path during initial and/or final approach			V			
332		Continued approach, when below DA(H) or MDA(H), after loss of visual references			V			
333		Late or inadequate response to MSAW warning			V			
334		Failure to go-around, when so required			V			
335		Failure to follow published missed-approach procedure			V			
336		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.			V			



	Safety Performance	Disamusara		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
337		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of MSAW system.			V		1	
338		Lack of adherence to emergency procedures - flight deck smoke procedure		V				
339		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MSAW System			٧			
340		Lack of adherence to the current technology standards in terms of flight safety and efficiency - engines location.		V				
341		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. MSAW warning.			V			
342		Flaws in manufacturer quality control process - CPCS system and / or components		٧			1	
343		Flaws in aircraft system maintenance process definition - CPCS system and / or components		٧				
344		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - CPCS system and / or components		V				
345		Incorrect use of automation - CPCS		V				
346		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment					V	
347		Poor application of T/O & RTO procedure, braking initiation sequence					V	
348		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum					٧	
349		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.					V	
350		Poor application of T/O & RTO procedure, computation of T/O parameters					V	
351		Lack of adherence to AFM in terms of emergency procedures - engine failure		٧			1	
352		Lack of adherence to emergency procedures - control recovery		٧				
353		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ACAS system components				٧		
354		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS			V			
355		Inappropriate visual avoidance maneuver				V	1	
356		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ADI system components				٧		
357		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ACAS installed on aircraft.				٧		
358		Late or inadequate response to ACAS warning				V		
359		Flaws in aircraft system maintenance process definition - GPWS system components			V			
360		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - GPWS system components			٧			
361		Flaws in manufacturer quality control process - GPWS system components			V			



	Safety Performance	December		Ор	eration	al issu		
No.	Indicators	Precursors	1	2	3	4	5	6
131	Rate of loss of separation events/flight	Pilot tiredness - Inadequate workload distribution		٧	V	٧	٧	V
132		Flaws in pilot requirements definition process and/or training methodology		V	V	V	V	V
133		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology		٧	V	V	٧	V
134		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution		٧	V	V	٧	٧
135		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties		V	V	٧	٧	٧
136		Flaws in CRM training procedures		٧	V		٧	V
137		Lack of adherence to the main CRM rules		V	V		٧	V
138		Traffic controller tiredness - Inadequate workload distribution		V	V	V	٧	
139		Flaws in traffic controller requirements definition process and/or training methodology		٧	V	V	٧	
140		Lack of adherence to SOP in terms of approach and landing		V	V			V
141		Incorrect use of automation - FMS		V	V			V
142		Unintuitive and / or error prone system manual - FMS		V	V			V
143		Lack of adherence to the SOP in terms of critical indicators cross-checking		V	V			
144		Aggressive maneuvering / overcontrolling		٧				V
145		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.		V			V	
146		Lack of or poor communication quality			V	V	٧	
147		Lack of English proficiency		V	V	V	V	
148		Use of non-standard phraseology by pilot and/or controller		V	V	V	V	
149		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver			V	V	٧	
150		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fuel system components		V				
151		Flaws in aircraft system maintenance process definition - Fuel system compoonents		٧				
152		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components		V				
153		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		V			٧	V
154		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.		V	V		<u> </u>	V
155		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components			V	V	٧	



	Safety Performance	Draguesara		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
156		Flaws in manufacturer quality control process - Onboard navigational systems and components.			V	V	V	
157		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path		٧				٧
158		Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport in the case of adverse weather.		٧				٧
159		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)			>	V	٧	
160		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)			V	٧	٧	
161		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Integrity of primary aircraft structure.		٧				
162		Flaws in manufacturer quality control process - Integrity of primary aircraft structure.		V				
163		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)			V	V	V	
164		Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.		V				
165		Flaws in manufacturer quality control process - Engine systems and / or components		V				
166		Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing		V				V
167		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring		V			٧	
168		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		V			V	
169		Inadequate aircraft de-icing / anti-icing		V			٧	
170		Lack of adherence to SARPs in terms of avoiding adverse weather conditions during flight		V				
171		Altimeter setting error			V	V		
172		Lack of adherence to SOP in terms of AFM limitations		V				
173		Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure		V				V
174		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.		٧			٧	
175		Flaws in aircraft system maintenance process definition - Components of Wing control surface system.		V			V	
176		Flaws in manufacturer quality control process - Components of Wing control surface system.		V			٧	
177		Flaws in manufacturer quality control process - Fuel system components.		V				
178		Lack of adherence to emergency procedures - control recovery		٧				V
179		Flaws in manufacturer quality control process - Landing gear components.		V				
180		Flaws in aircraft system maintenance process definition - Landing gear components.		V				
181		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance		V			V	



	Safety Performance	Ducasuracus	T	Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
		with requirements - APU systems and / or components						
182		Flaws in aircraft system maintenance process definition - APU systems and / or components		V			V	
183		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine anti-ice systems and / or components		V				
184		Flaws in manufacturer quality control process - Engine anti-ice system and / or components		٧				
185		Flaws in aircraft system maintenance process definition - Engine anti-ice system and / or components		V				
186		Incorrect or confusing / misleading ATC instructions		V		V	٧	
187		Incorrect use of automation -Engine anti-ice system		V				
188		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Reduction gear in the engine		٧				
189		Flaws in manufacturer quality control process - Reduction gear in the engine.		٧				
190		Flaws in aircraft system maintenance process definition - Reduction gear in the engine.		V				
191		Inadequate de-icing method applied		V				
192		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Compressor in the engine		٧				
193		Flaws in manufacturer quality control process - Compressor in the engine.		٧				
194		Flaws in aircraft system maintenance process definition - Compressor in the engine.		٧				
195		Flaws in manufacturer quality control process - Engine accessory drive components.		V				
196		Flaws in aircraft system maintenance process definition - Engine accessory drive components.		V				
197		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine accessory drive components.		V				
198		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ECAM (or similar) system components.		٧				
199		Lack of adherence to Rules of the Air - adherence to Controller clearance				V	V	
200		Lack of adherence to emergency procedures - Fuel starvation		V				
201		Flaws in aircraft system maintenance process definition - Oil distribution system		V				
202		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Oil distribution system		٧				
203		Flaws in manufacturer quality control process - Oil distribution system		٧				
204		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.			V	V	V	
205		Flaws in aircraft system maintenance process definition - ECAM (or similar) system components.		V			l	



	Safety Performance	P		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
206		Unintuitive and / or error prone system manual - Engine anti-icing system		٧				
207		Lack of adherence to SOP in terms of de-icing / anti-icing procedures.		V				
208		Flaws in manufacturer quality control process - ECAM (or similar) system components.		٧				
209		Flaws in manufacturer quality control process - Fire extinguishing system components		٧		V	٧	
210		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ECAM.		V				
211		Flaws in manufacturer quality control process - APU systems and / or components		٧				
212		Flaws in Airspace and Air Traffic planning procedures design process				V	V	
213		Flaws in aircraft system maintenance process definition - Engine combustor		٧				
214		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine combustor		V				
215		Flaws in manufacturer quality control process - Engine combustor		٧				
216		Flaws in aircraft system maintenance process definition - Engine turbine components		٧				
217		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine turbine components		V				
218		Flaws in manufacturer quality control process - Engine turbine components		٧				
219		Current airport diagram not reflecting critical changes			V			
220		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).			٧			
221		Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination			٧			
222		Failure to check navigation accuracy before approach			٧			
223		Tactical or / and Planning Controller tiredness - Inadequate workload distribution				V		
224		Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology				V		
225		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. Navigational aid failure.			٧			
226		Lack of adherence to SOP for AIR operations in terms of controller error in approach clearence instruction			V			
227		Not recognized ground Navaids System failure not reflected in NOTAM messages			V			
228		Navigation deviation				V	V	
229		Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS)			V			
230		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS)			٧			
231		Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS)			V			



	Safety Performance	Discourage		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
232		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.				V	٧	
233		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.				V	٧	
234		Flaws in manufacturer quality control process - Communication equipment systems and components.				V	V	
235		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components		V			V	
236		Flaws in aircraft system maintenance process definition - Hydraulic System		V			V	
237		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components		V			V	
238		Unintuitive and / or error prone system manual - CPCS	<u> </u>	V			٧	V
239		Inadequate coordination between ATM centers and/or ATC sectors				V		
240		Flaws in aircraft system maintenance process definition - Fire detection system components		V			V	
241		Flaws in manufacturer quality control process - Fire detection system components		V			V	
242		Flaws in aircraft system maintenance process definition - Fire warning system		V			٧	
243		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system		٧			V	
244		Flaws in manufacturer quality control process - Fire warning system		V			V	
245		Hearback ommitted				V		
246		Flaws in aircraft system maintenance process definition - Electrical wiring System		V				
247		Unintuitive and / or error prone system manual - communication equipment.				V		
248		Altitude deviation				V		
249		Level bust (pilot lapse or late re-clearance by ATC)				V		
250		Flaws in conflict and separation minima infringement detection / elimination procedures				V		
251		Lack of adherence of airlines to time contraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data.				٧		
252		Incorrect use of communication equipment				V		
253		Separation of structural element / component of the aircraft during take-off or landing		V				
254		Flaws in aircraft system maintenance process definition - Engine systems and / or components		٧				
255		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Electrical / wiring system components		V				
256		Flaws in manufacturer quality control process - Electrical / wiring systems components		V			<u></u>	



	Safety Performance	Draguesara		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
257		Lack of adherence to SOP in terms of fuelling procedure		V				
258		Failure to comply with an altitude or speed restriction / constraint				V		
259		Deviation from flight trajectory commanded by controller				V		
260		Inadequate maintenance of fire vulnerable aircraft parts or components		V				
261		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements in terms of fire resistance		٧				
262		Lack of adherence to regulations concerning transport of DGR goods		V				
263		Lack of adherence to engine limitations		V				
264		Lack of adherence to SOP for take-off procedure in terms of altimeter callibration.				V		
265		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MTCD System				V		
266		Lack of adherence of airlines to declared Flight Plan.				V		
267		Failure to identify the pre-tactical conflict before it reach the tactical controller				V		
268		Lack of adherence to SOP for Airborne operation in terms of minimum seprataion				V		
269		Military activity in controlled airport or located within controlled area				V		
270		General aviation activity in controlled airport or located within controlled area				V		
271		Intensified traffic related to general aviation activity e. g. over GA airport / airfield				V		
272		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of fire detection / warning or / and extinguishing system.		٧				
273		Imbalanced and inaproppriate relation between cpt and his subordinates			V			
274		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components		٧			V	
275		Flaws in aircraft system maintenance process definition - Fire extinguishing system components		V			٧	
276		Lack of adherence to AFM in terms of emergency procedures - engine restart procedure		V				
277		Lack of adherence to SOP in terms of awareness on supporting systems warning		V				
278		Unintuitive and / or error prone system manual - ECAM		V				
279		Descent above desired descent profile		٧				٧
280		High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,)		٧				٧
281		Late deceleration and configuration set-up for approach and landing		V				V
282		DME / ILS DME confusion in assessing the final descent point / FAF		٧				٧
				_				



	Safety Performance	Decompose		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
283		Unstabilized final approach (high, fast, steep,)		V				٧
284		Flaws in manufacturer quality control process - Engine sensors		٧				
285		Flaws in aircraft system maintenance process definition - Engine sensors		٧				
286		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine sensors		٧				
287		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of STCA System.				٧		
288		Lack of adherence to regulations concerning independent ATCO monitoring				V		
289		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - STCA System				V		
290		Lack of adherence to AFM in terms of emergency procedures - fire detection and extinguishing procedure		V				
291		Go-around attempt after thrust reversers deployment		V				٧
292		Lack of adherence to AFM limitations for landing		V				٧
293		Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications					V	
294		Inadequate effectivenes of fire extinguishing system		V				
295		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine fuel distribution system		V				
296		Flaws in manufacturer quality control process - Engine fuel distribution system		٧				l
297		Flaws in aircraft system maintenance process definition - Engine fuel distribution system		V				
298		Unintuitive and / or error prone system manual - fire extinguishing system		V				
299		Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.					V	
300		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity					V	
301		Takeoff without clearance					V	
302		Landing without clearance					V	
303		Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings					٧	
304		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					٧	
305		Lack of adherence to SOP in terms of requested information support for other aircraft in terms of adverse weather conditions		٧				
306		Lack of adherence to SOP in terms of application of findings from weather report		V				-
307		Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots					V	1



	Safety Performance	Decourage		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
308		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence					٧	
309		Lack of adherence to AFM limitations for Take-off		V				
310		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components					٧	
311		Incorrect weather report obtained by the flight crew		V				1
312		Lack of adherence to SOP in terms of providing flight crew with current weather report		V				
313		Flaws in manufacturer quality control process - Power supply system components					٧	
314		Unintuitive and / or error prone system manual - On-board weather radar.		V				
315		Incorrect use of automation - On-board weather radar		V				
316		Lack of adherence to SOP for take-off procedure in terms of time limitation for take-off preparation.					V	
317		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - On-board weather radar		٧				
318		Flaws in manufacturer quality control process - On-board weather radar		V				
319		Flaws in aircraft system maintenance process definition - On-board weather radar		V				
320		Lack of adherence of passengers to the recommendation: Fasten seat belt while seated		V				
321		Lack of adherence to SOP in terms of "fasten your seat belt" information activation in passenger cabin during flight in turbulence conditions		٧				
322		Lack of adherence to the current technology standards in terms of flight safety and efficiency - fuel tank allocation.		V				
323		Lack of adherence to SOP in terms of AFM limitations in terms of weigh and balance		V				
324		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine					٧	
325		Flaws in manufacturer quality control process - Autothrottle system in the engine.					٧	
326		Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.					V	
327		Flaws in airport capacity management process					٧	
328		Inadequate airline / regulatory provider policy in terms of aware of the risks related to air travel		V				
329		Error in calculation of necessary amount of fuel		V				٧
330		Lack of adherence to SOP in terms of load sheet preparation and verification		V				
331		Late rejected takeoff decision / initiation					٧	
332		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components		V				
333		Flaws in aircraft system maintenance process definition - Aircraft door system and / or components		٧				



	Safety Performance	Ducasuracus	T	Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
334		Lack of adherence to SOP in terms of pre-flight inspections - cargo securing quality		V				
335		Flaws in manufacturer quality control process - CPCS system and / or components		V				
336		Flaws in aircraft system maintenance process definition - CPCS system and / or components		V				
337		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - CPCS system and / or components		٧				
338		Lack of adherence to SOP for GND movements.		V				
339		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum		٧			٧	V
340		Poor application of T/O & RTO procedure, failure recognition and preparedness					٧	
341		Lack of adherence to AFM in terms of emergency procedures - stall recovery		V				
342		Lack of adherence to emergency procedures - flight deck smoke procedure		V				
343		Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations					V	
344		Lack of adherence to the SOP in terms of critical maneuvre execution - flare		V				
345		Extreme operation condition / poor maintenance quality / advanced life lenght		V				
346		Incorrect use of automation - CPCS		V				
347		Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain)			V			
348		Premature descent to DA(H) before G/S intercept or premature descent to MDA(H) before final-descent-point / FAF			V			
349		Premature descent below MDA(H) before reaching the visual-descent-point (VDP)			V			
350		Flight below desired flight path during initial and/or final approach			V			
351		Continued approach, when below DA(H) or MDA(H), after loss of visual references			V			
352		Late or inadequate response to MSAW warning			V			
353		Failure to go-around, when so required			V			
354		Failure to follow published missed-approach procedure			V			
355		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of MSAW system.			V			
356		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MSAW System			V			
357		Lack of adherence to the current technology standards in terms of flight safety and efficiency - engines location.		V				
358		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. MSAW warning.			V			
359		Late activation of pedal braking or takeover from autobrake, when so required		V				٧
360		Delayed selection of reverse thrust		V				٧



	Safety Performance	Data sussession of the state of		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
361		Late thrust reduction or power-on touchdown		V				٧
362		Failure to arm ground-spoilers		V				٧
363		Inappropriate selection of autobrake mode for given runway length and condition		V				٧
364		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment					V	
365		Poor application of T/O & RTO procedure, braking initiation sequence					٧	
366		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.					٧	
367		Lack of adherence to SOP in terms of necessary amount of fuel		V				٧
368		Poor application of T/O & RTO procedure, computation of T/O parameters					٧	
369		Lack of adherence to AFM in terms of emergency procedures - engine failure		V				
370		Lack of adherence to SOP for approach and landing		V				
371		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ACAS system components				٧		
372		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS			V			
373		Inappropriate visual avoidance maneuver				V		
374		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ADI system components				٧		
375		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ACAS installed on aircraft.				٧		
376		Late or inadequate response to ACAS warning				V		
377		Flaws in aircraft system maintenance process definition - GPWS system components			V			
378		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - GPWS system components			٧			
379		Flaws in manufacturer quality control process - GPWS system components			V			
131	Rate of STCA warnings/flight	Pilot tiredness - Inadequate workload distribution		٧	V	٧	V	V
132		Flaws in pilot requirements definition process and/or training methodology		V	>	V	V	٧
133		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology		V	V	٧	٧	٧
134		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution		V	V	V	V	٧
135		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties		٧	٧	٧	٧	V
136		Traffic controller tiredness - Inadequate workload distribution		٧	V	٧	V	



	Safety Performance	Discourage		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
137		Flaws in traffic controller requirements definition process and/or training methodology		٧	V	V	V	
138		Flaws in CRM training procedures		٧	V		V	V
139		Lack of adherence to the main CRM rules		٧	V		V	٧
140		Lack of adherence to SOP in terms of approach and landing		٧	V			V
141		Incorrect use of automation - FMS		٧	V			V
142		Unintuitive and / or error prone system manual - FMS		V	V		- 	V
143		Lack of adherence to the SOP in terms of critical indicators cross-checking		٧	V			
144		Aggressive maneuvering / overcontrolling		V			- 	V
145		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.		V			V	
146		Lack of or poor communication quality			V	V	٧	
147		Lack of English proficiency		V	V	V	V	
148		Use of non-standard phraseology by pilot and/or controller		V	V	V	V	
149		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver			V	V	V	
150		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fuel system components		٧				
151		Flaws in aircraft system maintenance process definition - Fuel system compoonents		V				
152		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)		V	V	٧	٧	
153		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)		V	V	V	V	
154		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)		V	V	V	٧	
155		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.		V	V			V
156		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components		V				
157		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components			V	V	V	
158		Flaws in manufacturer quality control process - Onboard navigational systems and components.			V	V	V	
159		Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport in the case of adverse weather.		V				V
160		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		V			V	V
161		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path		V				V



	Safety Performance	Duraninana		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
162		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Integrity of primary aircraft structure.		٧				
163		Flaws in manufacturer quality control process - Integrity of primary aircraft structure.		V				
164		Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.		V			1	
165		Flaws in manufacturer quality control process - Engine systems and / or components		V			1	
166		Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing		V			1	٧
167		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring		V			V	
168		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		V			V	
169		Inadequate aircraft de-icing / anti-icing		V			V	
170		Lack of adherence to SARPs in terms of avoiding adverse weather conditions during flight		V				
171		Altimeter setting error			V	V		
172		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.		٧			٧	
173		Flaws in aircraft system maintenance process definition - Components of Wing control surface system.		V			V	
174		Flaws in manufacturer quality control process - Components of Wing control surface system.		V			V	
175		Lack of adherence to SOP in terms of AFM limitations		V				
176		Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure		V			 	٧
177		Flaws in manufacturer quality control process - Fuel system components.		V				
178		Lack of adherence to emergency procedures - control recovery		V				V
179		Flaws in manufacturer quality control process - Landing gear components.		V				
180		Flaws in aircraft system maintenance process definition - Landing gear components.		V				
181		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components		٧			٧	
182		Flaws in aircraft system maintenance process definition - APU systems and / or components		V			V	
183		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine anti-ice systems and / or components		٧				
184		Flaws in manufacturer quality control process - Engine anti-ice system and / or components		V				
185		Flaws in aircraft system maintenance process definition - Engine anti-ice system and / or components		٧				
186		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.			٧	٧	٧	
187		Incorrect or confusing / misleading ATC instructions		V		٧	V	



	Safety Performance	Durannana		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
188		Incorrect use of automation -Engine anti-ice system		V				
189		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Reduction gear in the engine		٧				
190		Flaws in manufacturer quality control process - Reduction gear in the engine.		V				
191		Flaws in aircraft system maintenance process definition - Reduction gear in the engine.		V				
192		Inadequate de-icing method applied		V				
193		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Compressor in the engine		V				
194		Flaws in manufacturer quality control process - Compressor in the engine.		V				
195		Flaws in aircraft system maintenance process definition - Compressor in the engine.		V				
196		Flaws in manufacturer quality control process - Engine accessory drive components.		V				
197		Flaws in aircraft system maintenance process definition - Engine accessory drive components.		V				
198		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine accessory drive components.		٧				
199		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ECAM (or similar) system components.		٧				
200		Lack of adherence to emergency procedures - Fuel starvation		V				
201		Flaws in aircraft system maintenance process definition - Oil distribution system		V				
202		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Oil distribution system		V				
203		Flaws in manufacturer quality control process - Oil distribution system		V				
204		Flaws in aircraft system maintenance process definition - ECAM (or similar) system components.		V				
205		Unintuitive and / or error prone system manual - Engine anti-icing system		٧				
206		Lack of adherence to SOP in terms of de-icing / anti-icing procedures.		V				
207		Flaws in manufacturer quality control process - ECAM (or similar) system components.		V				
208		Flaws in manufacturer quality control process - Fire extinguishing system components		V		V	V	
209		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ECAM.		٧				
210		Flaws in Airspace and Air Traffic planning procedures design process				٧	V	
211		Flaws in manufacturer quality control process - APU systems and / or components		٧				
212		Flaws in aircraft system maintenance process definition - Engine combustor		٧				
213		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance		V				



	Safety Performance	Disamusa a		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
		with requirements - Engine combustor						
214		Flaws in manufacturer quality control process - Engine combustor		V				
215		Flaws in aircraft system maintenance process definition - Engine turbine components		V				
216		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine turbine components		V				
217		Flaws in manufacturer quality control process - Engine turbine components		V				
218		Failure to check navigation accuracy before approach			V			
219		Lack of adherence to Rules of the Air - adherence to Controller clearance				V	٧	
220		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. Navigational aid failure.			V			
221		Not recognized ground Navaids System failure not reflected in NOTAM messages			V			
222		Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS)			V			
223		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS)			V			
224		Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS)			V			
225		Lack of adherence to SOP for AIR operations in terms of controller error in approach clearence instruction			V			
226		Current airport diagram not reflecting critical changes			V			
227		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).			V			
228		Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination			V			
229		Tactical or / and Planning Controller tiredness - Inadequate workload distribution				٧		
230		Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology				V		
231		Navigation deviation				V	٧	
232		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.				V	٧	
233		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.				٧	٧	
234		Flaws in manufacturer quality control process - Communication equipment systems and components.				V	V	
235		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components		V			٧	
236		Flaws in aircraft system maintenance process definition - Hydraulic System	_	V			٧	
237		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components		V			٧	



	Safety Performance	Dan sausana		Ор	eration	al issu		
No.	Indicators	Precursors	1	2	3	4	5	6
238		Inadequate coordination between ATM centers and/or ATC sectors				V		
239		Flaws in aircraft system maintenance process definition - Fire detection system components		٧			٧	
240		Flaws in manufacturer quality control process - Fire detection system components		٧			٧	
241		Flaws in aircraft system maintenance process definition - Fire warning system		٧			٧	
242		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system		٧			V	
243		Flaws in manufacturer quality control process - Fire warning system		٧			V	
244		Unintuitive and / or error prone system manual - CPCS		٧			V	V
245		Hearback ommitted				٧		
246		Flaws in aircraft system maintenance process definition - Electrical wiring System		٧				
247		Unintuitive and / or error prone system manual - communication equipment.				V		
248		Altitude deviation				V		
249		Level bust (pilot lapse or late re-clearance by ATC)				V		
250		Flaws in conflict and separation minima infringement detection / elimination procedures				V		
251		Lack of adherence of airlines to time contraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data.				٧		
252		Incorrect use of communication equipment				٧		
253		Separation of structural element / component of the aircraft during take-off or landing		٧				
254		Flaws in aircraft system maintenance process definition - Engine systems and / or components		٧				
255		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Electrical / wiring system components		٧				
256		Flaws in manufacturer quality control process - Electrical / wiring systems components		٧				
257		Lack of adherence to SOP in terms of fuelling procedure		٧				
258		Failure to comply with an altitude or speed restriction / constraint				V		
259		Deviation from flight trajectory commanded by controller				V		
260		Inadequate maintenance of fire vulnerable aircraft parts or components		٧				
261		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements in terms of fire resistance		٧				
262		Lack of adherence to regulations concerning transport of DGR goods		V				
263		Lack of adherence to engine limitations		٧				



	Safety Performance	Dun annua an		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
264		Lack of adherence to SOP for take-off procedure in terms of altimeter callibration.				V	1	
265		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MTCD System				٧		
266		Lack of adherence of airlines to declared Flight Plan.				V	1	
267		Failure to identify the pre-tactical conflict before it reach the tactical controller				V		
268		Lack of adherence to SOP for Airborne operation in terms of minimum seprataion				V		
269		Military activity in controlled airport or located within controlled area				V		
270		General aviation activity in controlled airport or located within controlled area				V	- 	
271		Intensified traffic related to general aviation activity e. g. over GA airport / airfield				V		
272		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of fire detection / warning or / and extinguishing system.		V				
273		Imbalanced and inaproppriate relation between cpt and his subordinates			٧			
274		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components		V			٧	
275		Flaws in aircraft system maintenance process definition - Fire extinguishing system components		V			V	
276		Lack of adherence to AFM in terms of emergency procedures - engine restart procedure		V				
277		Lack of adherence to SOP in terms of awareness on supporting systems warning		٧				
278		Unintuitive and / or error prone system manual - ECAM		V				
279		Descent above desired descent profile		٧			1	٧
280		High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,)		٧				٧
281		Late deceleration and configuration set-up for approach and landing		V				٧
282		DME / ILS DME confusion in assessing the final descent point / FAF		V				٧
283		Unstabilized final approach (high, fast, steep,)		٧			1	٧
284		Flaws in manufacturer quality control process - Engine sensors		V				
285		Flaws in aircraft system maintenance process definition - Engine sensors		٧			1	
286		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine sensors		V				
287		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of STCA System.				V		
288		Lack of adherence to regulations concerning independent ATCO monitoring				V		
289		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance				V	1	



	Safety Performance	Data summaria		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
		with requirements - STCA System						
290		Lack of adherence to AFM in terms of emergency procedures - fire detection and extinguishing procedure		V				
291		Go-around attempt after thrust reversers deployment		٧				٧
292		Lack of adherence to AFM limitations for landing		٧				٧
293		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine		V			٧	
294		Flaws in manufacturer quality control process - Autothrottle system in the engine.		V			V	
295		Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.		V			V	
296		Inadequate effectivenes of fire extinguishing system		V				
297		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine fuel distribution system		V				
298		Flaws in manufacturer quality control process - Engine fuel distribution system		V				
299		Flaws in aircraft system maintenance process definition - Engine fuel distribution system		V				
300		Unintuitive and / or error prone system manual - fire extinguishing system		V				
301		Lack of adherence to AFM limitations for Take-off		٧				
302		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					V	
303		Lack of adherence to SOP in terms of requested information support for other aircraft in terms of adverse weather conditions		V				
304		Lack of adherence to SOP in terms of application of findings from weather report		V				
305		Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots					V	
306		Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.					٧	
307		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components					٧	
308		Incorrect weather report obtained by the flight crew		V				
309		Lack of adherence to SOP in terms of providing flight crew with current weather report		V				
310		Flaws in manufacturer quality control process - Power supply system components					V	
311		Flaws in airport capacity management process					V	
312		Unintuitive and / or error prone system manual - On-board weather radar.		٧				
313		Incorrect use of automation - On-board weather radar		٧				
314		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - On-board weather radar		V				



	Safety Performance	Drawwaye		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
315		Flaws in manufacturer quality control process - On-board weather radar		V				
316		Flaws in aircraft system maintenance process definition - On-board weather radar		V				
317		Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications					٧	
318		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence					٧	
319		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity					٧	
320		Takeoff without clearance					٧	
321		Landing without clearance					V	
322		Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings					V	
323		Lack of adherence of passengers to the recommendation: Fasten seat belt while seated		V				
324		Lack of adherence to SOP in terms of "fasten your seat belt" information activation in passenger cabin during flight in turbulence conditions		V				
325		Lack of adherence to the current technology standards in terms of flight safety and efficiency - fuel tank allocation.		V				
326		Lack of adherence to SOP in terms of AFM limitations in terms of weigh and balance		V				
327		Lack of adherence to SOP for take-off procedure in terms of time limitation for take-off preparation.					V	
328		Inadequate airline / regulatory provider policy in terms of aware of the risks related to air travel		V				
329		Lack of adherence to SOP in terms of pre-flight inspections - cargo securing quality		V				
330		Error in calculation of necessary amount of fuel		V				٧
331		Lack of adherence to SOP in terms of load sheet preparation and verification		V				
332		Late rejected takeoff decision / initiation					V	
333		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components		٧				
334		Flaws in aircraft system maintenance process definition - Aircraft door system and / or components		V				
335		Flaws in manufacturer quality control process - CPCS system and / or components		V				
336		Flaws in aircraft system maintenance process definition - CPCS system and / or components		V				
337		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - CPCS system and / or components		٧				
338		Lack of adherence to SOP for GND movements.		V				
339		Flight below maneuvering speeds		٧				
340		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice		V			V	V



	Safety Performance	Precursors		Ор	eration	al issu	e	
No.	Indicators	Precuisors	1	2	3	4	5	6
		presence / or runway surface friction rate below minimum						
341		Poor application of T/O & RTO procedure, failure recognition and preparedness					V	
342		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Rudder components.		V				
343		Flaws in aircraft system maintenance process definition - Rudder components.		٧				
344		Flaws in manufacturer quality control process - Rudder components.		٧				
345		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Horizontal stabilizer components.		V				
346		Flaws in aircraft system maintenance process definition - Horizontal stabilizer components.		٧				
347		Flaws in manufacturer quality control process - Horizontal stabilizer components.		V				
348		Lack of adherence to AFM in terms of emergency procedures - stall recovery		٧				
349		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Thrust reverse system in the engine.		٧				
350		Flaws in manufacturer quality control process - Thrust reverse system in the engine.		٧				
351		Flaws in aircraft system maintenance process definition - Thrust reverse system in the engine.		V				
352		Lack of adherence to emergency procedures - flight deck smoke procedure		V				
353		Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations					V	
354		Lack of adherence to the SOP in terms of critical maneuvre execution - flare		٧				
355		Extreme operation condition / poor maintenance quality / advanced life lenght		V				
356		Incorrect use of automation - CPCS		V				
357		Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain)			V			
358		Premature descent to DA(H) before G/S intercept or premature descent to MDA(H) before final-descent-point / FAF			V			
359		Premature descent below MDA(H) before reaching the visual-descent-point (VDP)			V			
360		Flight below desired flight path during initial and/or final approach			V			
361		Continued approach, when below DA(H) or MDA(H), after loss of visual references			V			
362		Late or inadequate response to MSAW warning			V			
363		Failure to go-around, when so required			V			
364		Failure to follow published missed-approach procedure			V			
365		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of MSAW system.			V			
366		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance			V			
								4



	Safety Performance	Drocursors		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
		with requirements - MSAW System						
367		Lack of adherence to the current technology standards in terms of flight safety and efficiency - engines location.		V				
368		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. MSAW warning.			V			
369		Late activation of pedal braking or takeover from autobrake, when so required		٧				٧
370		Delayed selection of reverse thrust		٧				٧
371		Late thrust reduction or power-on touchdown		٧				V
372		Failure to arm ground-spoilers		V				٧
373		Inappropriate selection of autobrake mode for given runway length and condition		٧				٧
374		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment					٧	
375		Poor application of T/O & RTO procedure, braking initiation sequence					٧	
376		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.					٧	
377		Lack of adherence to SOP in terms of necessary amount of fuel		٧				٧
378		Poor application of T/O & RTO procedure, computation of T/O parameters					٧	
379		Lack of adherence to emergency procedures - recovery from severe FCS failure		V				
380		Lack of adherence to AFM in terms of emergency procedures - engine failure		٧				
381		Flaws in aircraft system maintenance process definition - stickshaker			V			
382		Lack of adherence to SOP for approach and landing		V				
383		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ACAS system components				٧		
384		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS			V			
385		Inappropriate visual avoidance maneuver				V		
386		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ADI system components				٧		
387		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ACAS installed on aircraft.				٧		
388		Late or inadequate response to ACAS warning				V		
389		Flaws in aircraft system maintenance process definition - GPWS system components			٧			
390		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - GPWS system components			٧			
391		Flaws in manufacturer quality control process - GPWS system components			V		, ,	1



	Safety Performance	Drawware		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
131	Rate of EGPWS events/flight	Pilot tiredness - Inadequate workload distribution		٧	٧		٧	٧
132		Flaws in pilot requirements definition process and/or training methodology		V	V		V	V
133		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology		V	V		V	V
134		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution		٧	V		٧	V
135		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties		٧	٧			٧
136		Incorrect use of automation - FMS		V	٧			V
137		Unintuitive and / or error prone system manual - FMS		V	٧			V
138		Lack of adherence to SOP in terms of approach and landing		٧	٧			V
139		Lack of adherence to the SOP in terms of critical indicators cross-checking		V	V			
140		Flaws in CRM training procedures		V	V			V
141		Lack of adherence to the main CRM rules		٧	V			V
142		Aggressive maneuvering / overcontrolling		V				V
143		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.		V			V	
144		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).		V	V			٧
145		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fuel system components		٧				
146		Flaws in aircraft system maintenance process definition - Fuel system compoonents		V				
147		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		V			٧	٧
148		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.		٧	٧			٧
149		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components		٧				
150		Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport in the case of adverse weather.		٧				٧
151		Flaws in traffic controller requirements definition process and/or training methodology		V	V			V
152		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path		٧				٧
153		Traffic controller tiredness - Inadequate workload distribution		V	V			٧
154		Flaws in manufacturer quality control process - Engine systems and / or components		٧				



	Safety Performance	Precursors		Op	eration	al issu	е	
No.	Indicators	Precuisors	1	2	3	4	5	6
155		Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing		V				V
156		Inadequate aircraft de-icing / anti-icing		V			V	
157		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Integrity of primary aircraft structure.		٧				
158		Flaws in manufacturer quality control process - Integrity of primary aircraft structure.		V				
159		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring		V				
160		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		V				
161		Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.		V				
162		Lack of adherence to SOP in terms of AFM limitations		V				
163		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.		٧			٧	
164		Flaws in aircraft system maintenance process definition - Components of Wing control surface system.		V			٧	
165		Flaws in manufacturer quality control process - Components of Wing control surface system.		V			٧	
166		Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure		V				V
167		Flaws in manufacturer quality control process - Fuel system components.		V				
168		Lack of adherence to emergency procedures - control recovery		V				V
169		Lack of adherence to SARPs in terms of avoiding adverse weather conditions during flight		V				
170		Flaws in manufacturer quality control process - Landing gear components.		V				
171		Flaws in aircraft system maintenance process definition - Landing gear components.		V				
172		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components		٧			V	
173		Flaws in aircraft system maintenance process definition - APU systems and / or components		V			V	
174		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine anti-ice systems and / or components		٧				
175		Flaws in manufacturer quality control process - Engine anti-ice system and / or components		V				
176		Flaws in aircraft system maintenance process definition - Engine anti-ice system and / or components		V				
177		Incorrect use of automation -Engine anti-ice system		V				
178		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Reduction gear in the engine		٧				
179		Flaws in manufacturer quality control process - Reduction gear in the engine.		V				
180		Flaws in aircraft system maintenance process definition - Reduction gear in the engine.		V				



	Safety Performance	Precursors		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
181		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components			V		٧	
182		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.			V		V	
183		Flaws in manufacturer quality control process - Onboard navigational systems and components.			V		٧	
184		Inadequate de-icing method applied		V				
185		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Compressor in the engine		٧				
186		Flaws in manufacturer quality control process - Compressor in the engine.		V				1
187		Flaws in aircraft system maintenance process definition - Compressor in the engine.		V				
188		Flaws in manufacturer quality control process - Engine accessory drive components.		V				
189		Flaws in aircraft system maintenance process definition - Engine accessory drive components.		V				
190		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine accessory drive components.		V				
191		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ECAM (or similar) system components.		V				
192		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)			V		V	
193		Lack of adherence to emergency procedures - Fuel starvation		V				<u> </u>
194		Flaws in aircraft system maintenance process definition - Oil distribution system		٧				
195		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Oil distribution system		V				
196		Flaws in manufacturer quality control process - Oil distribution system		V				
197		Lack of or poor communication quality			V		٧	
198		Flaws in aircraft system maintenance process definition - ECAM (or similar) system components.		V				
199		Unintuitive and / or error prone system manual - Engine anti-icing system		V				
200		Lack of adherence to SOP in terms of de-icing / anti-icing procedures.		٧				
201		Flaws in manufacturer quality control process - ECAM (or similar) system components.		٧				
202		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ECAM.		٧				
203		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)			V		V	
204		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)			V		V	
205		Flaws in manufacturer quality control process - APU systems and / or components		V				



	Safety Performance	Dranusara		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
206		Flaws in aircraft system maintenance process definition - Engine combustor		٧				
207		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine combustor		٧				
208		Flaws in manufacturer quality control process - Engine combustor		V				l
209		Flaws in aircraft system maintenance process definition - Engine turbine components		٧				
210		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine turbine components		V				
211		Flaws in manufacturer quality control process - Engine turbine components		V				ł
212		Lack of English proficiency		٧	V			
213		Use of non-standard phraseology by pilot and/or controller		V	V			
214		Failure to check navigation accuracy before approach			٧			
215		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. Navigational aid failure.			V			
216		Not recognized ground Navaids System failure not reflected in NOTAM messages			V			
217		Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS)			V			
218		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS)			٧			
219		Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS)			V			
220		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver			V			
221		Current airport diagram not reflecting critical changes			V			1
222		Altimeter setting error			V			
223		Lack of adherence to SOP for AIR operations in terms of controller error in approach clearence instruction			V			
224		Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination			V			
225		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components		٧			V	
226		Flaws in aircraft system maintenance process definition - Hydraulic System		V			V	
227		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components		٧			V	
228		Flaws in aircraft system maintenance process definition - Fire detection system components		V	_		V	
229		Flaws in manufacturer quality control process - Fire detection system components		V			٧	-
230		Flaws in aircraft system maintenance process definition - Fire warning system		٧			V	



	Safety Performance	December 2		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
231		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system		٧			٧	
232		Flaws in manufacturer quality control process - Fire warning system		٧			V	
233		Flaws in aircraft system maintenance process definition - Electrical wiring System		٧				
234		Separation of structural element / component of the aircraft during take-off or landing		٧				
235		Flaws in aircraft system maintenance process definition - Engine systems and / or components		٧				
236		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Electrical / wiring system components		٧				
237		Flaws in manufacturer quality control process - Electrical / wiring systems components		٧				
238		Lack of adherence to SOP in terms of fuelling procedure		V				
239		Inadequate maintenance of fire vulnerable aircraft parts or components		٧				
240		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements in terms of fire resistance		V				
241		Lack of adherence to regulations concerning transport of DGR goods		V				
242		Lack of adherence to engine limitations		٧				
243		High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,)		٧				٧
244		Late deceleration and configuration set-up for approach and landing		V				V
245		DME / ILS DME confusion in assessing the final descent point / FAF		٧				٧
246		Unstabilized final approach (high, fast, steep,)		٧				٧
247		Unintuitive and / or error prone system manual - CPCS		٧			V	٧
248		Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared		V				V
249		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System.		V				٧
250		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of fire detection / warning or / and extinguishing system.		٧				
251		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system		٧				٧
252		Flaws in manufacturer quality control process - PWS system components		٧				٧
253		Imbalanced and inaproppriate relation between cpt and his subordinates			V			
254		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.		٧				٧
255		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - LLWAS system		٧				٧



	Safety Performance	December 2		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
256		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components		٧			V	
257		Flaws in aircraft system maintenance process definition - Fire extinguishing system components		V			V	
258		Flaws in manufacturer quality control process - Fire extinguishing system components		V			٧	
259		Descent above desired descent profile		V				٧
260		Lack of adherence to AFM limitations for landing		V				٧
261		Lack of adherence to AFM in terms of emergency procedures - engine restart procedure		V				
262		Lack of adherence to SOP in terms of awareness on supporting systems warning		V				
263		Unintuitive and / or error prone system manual - ECAM		V				
264		Flaws in manufacturer quality control process - Engine sensors		V				
265		Flaws in aircraft system maintenance process definition - Engine sensors		٧				
266		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine sensors		V				
267		Lack of adherence to emergency procedures - WEM		V				٧
268		Lack of adherence to AFM in terms of emergency procedures - fire detection and extinguishing procedure		V				
269		Go-around attempt after thrust reversers deployment		V				٧
270		Inadequate effectivenes of fire extinguishing system		V				
271		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine fuel distribution system		V				
272		Flaws in manufacturer quality control process - Engine fuel distribution system		V				
273		Flaws in aircraft system maintenance process definition - Engine fuel distribution system		٧				
274		Unintuitive and / or error prone system manual - fire extinguishing system		V				
275		Excessive pitch attitude		٧				
276		Excessive bank angle		٧				
277		Lack of adherence to AFM limitations for Take-off		٧				
278		Lack of adherence to the SOP in terms of critical maneuvre execution		V				
279		Difference indications of independent aircraft speed / altitude or attitude indicators		V				
280		Lack of adherence to SOP in terms of safety best practices		V				
281		Flaws in aircraft system maintenance process definition - ADI system components		V				
282		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance		V				



	Safety Performance	Precursors		Ор	eration	al issu	e	-
No.	Indicators	Precuisors	1	2	3	4	5	6
		with requirements - ADI system components			1			
283		Flaws in manufacturer quality control process - ADI system components		V				
284		Lack of adherence to AFM in terms of emergency procedures - stall recovery		V				
285		Navigation deviation					V	
286		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components					٧	
287		Flaws in manufacturer quality control process - Power supply system components					٧	
288		Lack of adherence to the current technology standards in terms of flight safety and efficiency - fuel tank allocation.		V				
289		Lack of adherence to SOP in terms of AFM limitations in terms of weigh and balance		V				
290		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.					V	
291		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.					V	
292		Flaws in manufacturer quality control process - Communication equipment systems and components.					V	
293		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine					V	
294		Flaws in manufacturer quality control process - Autothrottle system in the engine.					V	
295		Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.					٧	
296		Tailwind component above limit						٧
297		Lack of adherence to SOP in terms of pre-flight inspections - cargo securing quality		V				
298		Error in calculation of necessary amount of fuel		V				٧
299		Lack of adherence to SOP in terms of load sheet preparation and verification		V				
300		Incorrect or confusing / misleading ATC instructions		V	V			
301		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum		٧			٧	٧
302		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					V	
303		Poor application of T/O & RTO procedure, failure recognition and preparedness					٧	
304		Lack of adherence to SOP for GND movements.		V				
305		Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain)			V			
306		Premature descent to DA(H) before G/S intercept or premature descent to MDA(H) before final-descent-point / FAF			V			
307		Premature descent below MDA(H) before reaching the visual-descent-point (VDP)			V			



	Safety Performance	Discourage		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
308		Flight below desired flight path during initial and/or final approach			V			
309		Continued approach, when below DA(H) or MDA(H), after loss of visual references			V			
310		Late or inadequate response to MSAW warning			V			
311		Failure to go-around, when so required			V			
312		Failure to follow published missed-approach procedure			V			
313		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of MSAW system.			V			
314		Lack of adherence to emergency procedures - flight deck smoke procedure		٧				
315		Lack of adherence to AFM in terms of emergency procedures - windshear recovery		٧				
316		Lack of adherence to the SOP in terms of critical maneuvre execution - flare		V				
317		Extreme operation condition / poor maintenance quality / advanced life lenght		V				
318		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components		٧				
319		Flaws in aircraft system maintenance process definition - Aircraft door system and / or components		V				
320		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MSAW System			V			
321		Lack of adherence to the current technology standards in terms of flight safety and efficiency - engines location.		V				
322		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. MSAW warning.			V			
323		Flaws in manufacturer quality control process - CPCS system and / or components		V				
324		Flaws in aircraft system maintenance process definition - CPCS system and / or components		V				
325		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - CPCS system and / or components		٧				
326		Incorrect use of automation - CPCS		V				
327		Late activation of pedal braking or takeover from autobrake, when so required		V				٧
328		Delayed selection of reverse thrust		V				٧
329		Late thrust reduction or power-on touchdown		V				٧
330		Failure to arm ground-spoilers		V				٧
331		Inappropriate selection of autobrake mode for given runway length and condition		٧				٧
332		Use of non-standard phraseology by pilot flying (PF) and/or pilot not flying (PNF)		٧				
333		Lack of adherence to SOP in terms of necessary amount of fuel		٧				٧
334		Lack of adherence to AFM in terms of emergency procedures - engine failure		V				



	Safety Performance	Ducasingana		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
335		Flaws in aircraft system maintenance process definition - stickshaker			٧			
336		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment					V	
337		Poor application of T/O & RTO procedure, braking initiation sequence					٧	
338		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.					٧	
339		Lack of adherence to SOP for approach and landing		٧				
340		Poor application of T/O & RTO procedure, computation of T/O parameters					V	
341		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS			٧			
342		Flaws in aircraft system maintenance process definition - GPWS system components			٧			
343		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - GPWS system components			٧			
344		Flaws in manufacturer quality control process - GPWS system components			V			
131	Rate of incorrect flight crew response to genuine EGPWS warnings/warning	Pilot tiredness - Inadequate workload distribution		V	V		٧	V
132		Flaws in pilot requirements definition process and/or training methodology		V	V		V	V
133		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology		V	٧		٧	V
134		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution		V	V		V	V
135		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties		٧	V			
136		Lack of adherence to the SOP in terms of critical indicators cross-checking		V	V			
137		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.		V			V	
138		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).		V	٧			٧
139		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fuel system components		٧				
140		Flaws in aircraft system maintenance process definition - Fuel system compoonents		٧				
141		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components		V				
142		Flaws in traffic controller requirements definition process and/or training methodology		٧	٧			V
143		Traffic controller tiredness - Inadequate workload distribution		V	٧			٧
144		Flaws in manufacturer quality control process - Engine systems and / or components		٧				



	Safety Performance	Durannana		Ор	eration	al issu	<u> </u>	
No.	Indicators	Precursors	1	2	3	4	5	6
145		Aggressive maneuvering / overcontrolling		V				
146		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		٧			٧	V
147		Inadequate aircraft de-icing / anti-icing		V			V	
148		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Integrity of primary aircraft structure.		٧				
149		Flaws in manufacturer quality control process - Integrity of primary aircraft structure.		V			1	
150		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring		V				
151		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		V				
152		Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.		٧				
153		Lack of adherence to SOP in terms of AFM limitations		V				
154		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.		V			٧	
155		Flaws in aircraft system maintenance process definition - Components of Wing control surface system.		V			V	
156		Flaws in manufacturer quality control process - Components of Wing control surface system.		V			٧	
157		Flaws in manufacturer quality control process - Fuel system components.		V				
158		Lack of adherence to SARPs in terms of avoiding adverse weather conditions during flight		V				
159		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components		٧			٧	
160		Flaws in aircraft system maintenance process definition - APU systems and / or components		V			٧	
161		Incorrect use of automation - FMS		V	٧			
162		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine anti-ice systems and / or components		V				
163		Flaws in manufacturer quality control process - Engine anti-ice system and / or components		V				
164		Flaws in aircraft system maintenance process definition - Engine anti-ice system and / or components		V				
165		Incorrect use of automation -Engine anti-ice system		V				
166		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)			V		٧	
167		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components			٧		٧	
168		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.			V		V	
169		Flaws in manufacturer quality control process - Onboard navigational systems and components.			V		V	



	Safety Performance	Draniusava		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
170		Unintuitive and / or error prone system manual - FMS		V	٧			
171		Inadequate de-icing method applied		V				
172		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ECAM (or similar) system components.		٧				
173		Lack of adherence to emergency procedures - Fuel starvation		V				
174		Lack of or poor communication quality			V		٧	
175		Flaws in aircraft system maintenance process definition - ECAM (or similar) system components.		V				
176		Unintuitive and / or error prone system manual - Engine anti-icing system		V				
177		Lack of adherence to SOP in terms of de-icing / anti-icing procedures.		V				
178		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)			V		V	
179		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Reduction gear in the engine		٧				
180		Flaws in manufacturer quality control process - Reduction gear in the engine.		V				
181		Flaws in aircraft system maintenance process definition - Reduction gear in the engine.		V				
182		Flaws in manufacturer quality control process - ECAM (or similar) system components.		V				
183		Flaws in manufacturer quality control process - Landing gear components.		V				
184		Flaws in aircraft system maintenance process definition - Landing gear components.		V				
185		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)			V		V	
186		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Compressor in the engine		٧				
187		Flaws in manufacturer quality control process - Compressor in the engine.		V				
188		Flaws in aircraft system maintenance process definition - Compressor in the engine.		V				
189		Flaws in manufacturer quality control process - Engine accessory drive components.		V				
190		Flaws in aircraft system maintenance process definition - Engine accessory drive components.		V				
191		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine accessory drive components.		٧				
192		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ECAM.		V				
193		Flaws in aircraft system maintenance process definition - Oil distribution system		٧				
194		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Oil distribution system		V				
195		Flaws in manufacturer quality control process - Oil distribution system		V				



	Safety Performance	December 2		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
196		Flaws in manufacturer quality control process - APU systems and / or components		V				
197		Lack of adherence to SOP in terms of approach and landing			V			
198		Lack of English proficiency		V	V			
199		Use of non-standard phraseology by pilot and/or controller		V	V			
200		Flaws in aircraft system maintenance process definition - Engine combustor		٧				
201		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine combustor		٧				
202		Flaws in manufacturer quality control process - Engine combustor		V				
203		Flaws in aircraft system maintenance process definition - Engine turbine components		V				
204		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine turbine components		٧				
205		Flaws in manufacturer quality control process - Engine turbine components		V				
206		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS)			V			
207		Failure to check navigation accuracy before approach			V			
208		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. Navigational aid failure.			V			
209		Not recognized ground Navaids System failure not reflected in NOTAM messages			V			
210		Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS)			V			
211		Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS)			V			
212		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver			V			
213		Current airport diagram not reflecting critical changes			V			
214		Altimeter setting error			V			
215		Lack of adherence to SOP for AIR operations in terms of controller error in approach clearence instruction			V			
216		Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination			V			
217		Flaws in CRM training procedures			V			
218		Lack of adherence to the main CRM rules			V			
219		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components		٧			V	
220		Flaws in aircraft system maintenance process definition - Hydraulic System		V			٧	
221		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance		V			V	



	Safety Performance	Discourage		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
		with requirements - Fire deection system components						
222		Flaws in aircraft system maintenance process definition - Fire detection system components		V			V	
223		Flaws in manufacturer quality control process - Fire detection system components		V			٧	
224		Flaws in aircraft system maintenance process definition - Fire warning system		٧			٧	
225		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system		٧			٧	
226		Flaws in manufacturer quality control process - Fire warning system		V			V	
227		Flaws in aircraft system maintenance process definition - Electrical wiring System		V				
228		Separation of structural element / component of the aircraft during take-off or landing		V				
229		Flaws in aircraft system maintenance process definition - Engine systems and / or components		V				
230		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Electrical / wiring system components		٧				
231		Flaws in manufacturer quality control process - Electrical / wiring systems components		V				
232		Lack of adherence to SOP in terms of fuelling procedure		V				
233		Inadequate maintenance of fire vulnerable aircraft parts or components		V				
234		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements in terms of fire resistance		٧				
235		Lack of adherence to regulations concerning transport of DGR goods		V				
236		Lack of adherence to engine limitations		V				
237		Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared		V				٧
238		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System.		V				٧
239		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of fire detection / warning or / and extinguishing system.		٧				
240		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system		٧				٧
241		Flaws in manufacturer quality control process - PWS system components		V				٧
242		Imbalanced and inaproppriate relation between cpt and his subordinates			V			
243		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.		٧				٧
244		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - LLWAS system		٧				٧
245		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components		٧			٧	



	Safety Performance	Duraninana		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
246		Flaws in aircraft system maintenance process definition - Fire extinguishing system components		V			V	
247		Flaws in manufacturer quality control process - Fire extinguishing system components		V			V	
248		Lack of adherence to AFM in terms of emergency procedures - engine restart procedure		V				
249		Unintuitive and / or error prone system manual - CPCS		V			V	٧
250		Lack of adherence to SOP in terms of awareness on supporting systems warning		٧				
251		Unintuitive and / or error prone system manual - ECAM		V				
252		Flaws in manufacturer quality control process - Engine sensors		٧				
253		Flaws in aircraft system maintenance process definition - Engine sensors		V				
254		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine sensors		٧				
255		Lack of adherence to emergency procedures - WEM		V				٧
256		Lack of adherence to AFM in terms of emergency procedures - fire detection and extinguishing procedure		V				
257		Inadequate effectivenes of fire extinguishing system		V				
258		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine fuel distribution system		٧				
259		Flaws in manufacturer quality control process - Engine fuel distribution system		V				
260		Flaws in aircraft system maintenance process definition - Engine fuel distribution system		V				
261		Unintuitive and / or error prone system manual - fire extinguishing system		V				
262		Excessive pitch attitude		V				
263		Excessive bank angle		V				
264		Lack of adherence to the SOP in terms of critical maneuvre execution		٧				
265		Difference indications of independent aircraft speed / altitude or attitude indicators		٧				
266		Lack of adherence to SOP in terms of safety best practices		V				
267		Flaws in aircraft system maintenance process definition - ADI system components		V				
268		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ADI system components		٧				
269		Flaws in manufacturer quality control process - ADI system components		V				
270		Lack of adherence to AFM in terms of emergency procedures - stall recovery		٧				
271		Navigation deviation					V	
272		Lack of adherence to AFM limitations for Take-off		V				



	Safety Performance	Discourage		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
273		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components					٧	
274		Flaws in manufacturer quality control process - Power supply system components					٧	
275		Lack of adherence to the current technology standards in terms of flight safety and efficiency - fuel tank allocation.		٧				
276		Lack of adherence to SOP in terms of AFM limitations in terms of weigh and balance		V				
277		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.					V	
278		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.					٧	
279		Flaws in manufacturer quality control process - Communication equipment systems and components.					٧	
280		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine					٧	
281		Flaws in manufacturer quality control process - Autothrottle system in the engine.					٧	
282		Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.					V	
283		High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,)						٧
284		Late deceleration and configuration set-up for approach and landing						V
285		DME / ILS DME confusion in assessing the final descent point / FAF						V
286		Unstabilized final approach (high, fast, steep,)						٧
287		Tailwind component above limit						V
288		Lack of adherence to SOP in terms of pre-flight inspections - cargo securing quality		V				
289		Lack of adherence to SOP in terms of load sheet preparation and verification		V				
290		Incorrect or confusing / misleading ATC instructions		V	V			
291		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					V	
292		Poor application of T/O & RTO procedure, failure recognition and preparedness					V	
293		Lack of adherence to SOP for GND movements.		٧				
294		Error in calculation of necessary amount of fuel		٧				
295		Lack of adherence to AFM limitations for landing						٧
296		Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain)			V			
297		Premature descent to DA(H) before G/S intercept or premature descent to MDA(H) before final-descent-point / FAF			V			
298		Premature descent below MDA(H) before reaching the visual-descent-point (VDP)			V			



	Safety Performance	Discourage		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
299		Flight below desired flight path during initial and/or final approach			V			
300		Continued approach, when below DA(H) or MDA(H), after loss of visual references			V			
301		Late or inadequate response to MSAW warning			V			
302		Failure to go-around, when so required			V			
303		Failure to follow published missed-approach procedure			V			
304		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.			٧			
305		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of MSAW system.			V			
306		Lack of adherence to emergency procedures - flight deck smoke procedure		V				
307		Lack of adherence to AFM in terms of emergency procedures - windshear recovery		V				
308		Lack of adherence to the SOP in terms of critical maneuvre execution - flare		٧				
309		Extreme operation condition / poor maintenance quality / advanced life lenght		V				
310		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components		٧				
311		Flaws in aircraft system maintenance process definition - Aircraft door system and / or components		V				
312		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MSAW System			٧			
313		Lack of adherence to the current technology standards in terms of flight safety and efficiency - engines location.		V				
314		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. MSAW warning.			V			
315		Flaws in manufacturer quality control process - CPCS system and / or components		V				
316		Flaws in aircraft system maintenance process definition - CPCS system and / or components		V				
317		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - CPCS system and / or components		٧				
318		Incorrect use of automation - CPCS		V				
319		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum					٧	V
320		Use of non-standard phraseology by pilot flying (PF) and/or pilot not flying (PNF)		V				
321		Descent above desired descent profile						٧
322		Lack of adherence to AFM in terms of emergency procedures - engine failure		٧				
323		Lack of adherence to emergency procedures - control recovery					-	٧
324		Flaws in aircraft system maintenance process definition - stickshaker			V			



	Safety Performance	Decompose		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
325		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment					٧	
326		Poor application of T/O & RTO procedure, braking initiation sequence					٧	
327		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.					V	
328		Poor application of T/O & RTO procedure, computation of T/O parameters					٧	
329		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS			V			
330		Flaws in aircraft system maintenance process definition - GPWS system components			V			
331		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - GPWS system components			٧			
332		Flaws in manufacturer quality control process - GPWS system components			٧			
131	Rate of navigational errors which result in a loss of separation with terrain/flight	Pilot tiredness - Inadequate workload distribution		V	V		٧	٧
132		Flaws in pilot requirements definition process and/or training methodology		V	٧		V	V
133		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology		٧	٧		٧	V
134		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution		V	٧		V	V
135		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties		٧	٧		٧	٧
136		Lack of adherence to SOP in terms of approach and landing		V	V			V
137		Incorrect use of automation - FMS		٧	٧			V
138		Unintuitive and / or error prone system manual - FMS		V	V			V
139		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.		V			V	
140		Aggressive maneuvering / overcontrolling		V				V
141		Flaws in CRM training procedures		٧	٧			V
142		Lack of adherence to the main CRM rules		٧	٧			V
143		Lack of adherence to the SOP in terms of critical indicators cross-checking		٧	٧			
144		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		V			٧	٧
145		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components		V			V	
146		Flaws in manufacturer quality control process - Engine systems and / or components		V			V	



	Safety Performance	Discourage		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
147		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fuel system components		٧				
148		Flaws in aircraft system maintenance process definition - Fuel system compoonents		V				
149		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring		V			V	
150		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		V			V	
151		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.		٧	V			٧
152		Inadequate aircraft de-icing / anti-icing		V			٧	
153		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path		٧				V
154		Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing		V				٧
155		Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport in the case of adverse weather.		٧				V
156		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.		٧			٧	
157		Flaws in aircraft system maintenance process definition - Components of Wing control surface system.		V			V	
158		Flaws in manufacturer quality control process - Components of Wing control surface system.		V			V	
159		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)		٧	V		٧	
160		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Integrity of primary aircraft structure.		٧				
161		Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.		V				
162		Flaws in manufacturer quality control process - Integrity of primary aircraft structure.		V				
163		Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure		V				٧
164		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)		V	V		V	
165		Flaws in manufacturer quality control process - Fuel system components.		V				
166		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)		V	V		V	
167		Lack of adherence to emergency procedures - control recovery		٧				٧
168		Lack of adherence to SOP in terms of de-icing / anti-icing procedures.		٧			٧	
169		Lack of adherence to SARPs in terms of avoiding adverse weather conditions during flight		V				
170		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components		٧			V	



	Safety Performance	Discourage .		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
171		Flaws in aircraft system maintenance process definition - APU systems and / or components		V			٧	
172		Lack of adherence to SOP in terms of AFM limitations		V				
173		Flaws in manufacturer quality control process - Landing gear components.		V				
174		Flaws in aircraft system maintenance process definition - Landing gear components.		٧				
175		Flaws in aircraft system maintenance process definition - Engine systems and / or components		V			V	
176		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).		٧	٧			
177		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine anti-ice systems and / or components		٧				
178		Flaws in manufacturer quality control process - Engine anti-ice system and / or components		V				
179		Flaws in aircraft system maintenance process definition - Engine anti-ice system and / or components		٧				
180		Incorrect use of automation -Engine anti-ice system		V				
181		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components			V		V	
182		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.			V		٧	
183		Flaws in manufacturer quality control process - Onboard navigational systems and components.			V		V	
184		Flaws in traffic controller requirements definition process and/or training methodology		V	V			
185		Inadequate de-icing method applied		V				
186		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ECAM (or similar) system components.		٧				
187		Traffic controller tiredness - Inadequate workload distribution		V	V			1
188		Lack of or poor communication quality			V		V	
189		Flaws in aircraft system maintenance process definition - ECAM (or similar) system components.		V				
190		Unintuitive and / or error prone system manual - Engine anti-icing system		V				
191		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Reduction gear in the engine		٧				
192		Flaws in manufacturer quality control process - Reduction gear in the engine.		V				1
193		Flaws in aircraft system maintenance process definition - Reduction gear in the engine.		٧				
194		Flaws in manufacturer quality control process - ECAM (or similar) system components.		٧				
195		Lack of adherence to emergency procedures - Fuel starvation		V				
196		Unintuitive and / or error prone system manual - CPCS		V			V	٧



	Safety Performance	December 1		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
197		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Compressor in the engine		٧				
198		Flaws in manufacturer quality control process - Compressor in the engine.		٧				
199		Flaws in aircraft system maintenance process definition - Compressor in the engine.		٧				
200		Flaws in manufacturer quality control process - Engine accessory drive components.		V				
201		Flaws in aircraft system maintenance process definition - Engine accessory drive components.		V				
202		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine accessory drive components.		٧				
203		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ECAM.		V				
204		Flaws in aircraft system maintenance process definition - Oil distribution system		٧				
205		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Oil distribution system		٧				
206		Flaws in manufacturer quality control process - Oil distribution system		V				
207		Flaws in manufacturer quality control process - APU systems and / or components		V				
208		Lack of English proficiency		V	V			
209		Use of non-standard phraseology by pilot and/or controller		٧	٧			
210		Flaws in aircraft system maintenance process definition - Electrical wiring System		V			V	
211		Flaws in aircraft system maintenance process definition - Engine combustor		V				
212		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine combustor		V				
213		Flaws in manufacturer quality control process - Engine combustor		٧				
214		Flaws in aircraft system maintenance process definition - Engine turbine components		٧				
215		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine turbine components		V				
216		Flaws in manufacturer quality control process - Engine turbine components		٧				
217		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS)			٧			
218		Failure to check navigation accuracy before approach			>			
219		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. Navigational aid failure.			٧			
220		Not recognized ground Navaids System failure not reflected in NOTAM messages			٧			
221		Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS)			V			



	Safety Performance	Discourage		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
222		Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS)			V			
223		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver			V			
224		Current airport diagram not reflecting critical changes			V			
225		Altimeter setting error			V			
226		Lack of adherence to SOP for AIR operations in terms of controller error in approach clearence instruction			V			
227		Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination			V			
228		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components		V			V	
229		Flaws in aircraft system maintenance process definition - Hydraulic System		V			V	
230		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components		V			V	
231		Flaws in aircraft system maintenance process definition - Fire detection system components		V			V	
232		Flaws in manufacturer quality control process - Fire detection system components		V			V	
233		Flaws in aircraft system maintenance process definition - Fire warning system		V			V	
234		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system		٧			٧	
235		Flaws in manufacturer quality control process - Fire warning system		V			V	
236		Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.					٧	
237		Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.					٧	
238		Unintuitive and / or error prone system manual - FMC					V	
239		Incorrect stab-trim setting					V	
240		Undetected incorrect takeoff configuration					٧	
241		Separation of structural element / component of the aircraft during take-off or landing		V				
242		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Electrical / wiring system components		٧				
243		Flaws in manufacturer quality control process - Electrical / wiring systems components		V				
244		Lack of adherence to SOP in terms of fuelling procedure		٧				
245		Inadequate maintenance of fire vulnerable aircraft parts or components		٧				
246		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements in terms of fire resistance		V				



	Safety Performance	December 1		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
247		Lack of adherence to regulations concerning transport of DGR goods		V				
248		Lack of adherence to engine limitations		V				
249		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					V	
250		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of fire detection / warning or / and extinguishing system.		V				
251		Imbalanced and inaproppriate relation between cpt and his subordinates			V			
252		High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,)		V				V
253		Late deceleration and configuration set-up for approach and landing		V				V
254		Unstabilized final approach (high, fast, steep,)		V				V
255		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components		٧			٧	
256		Flaws in manufacturer quality control process - Power supply system components		V			V	
257		Flaws in aircraft system maintenance process definition - Fire extinguishing system components		٧			V	
258		Flaws in manufacturer quality control process - Fire extinguishing system components		V			V	
259		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components					٧	
260		Lack of adherence to AFM in terms of emergency procedures - engine restart procedure		V				
261		Poor application of T/O & RTO procedure, failure recognition and preparedness					V	
262		Lack of adherence to SOP in terms of awareness on supporting systems warning		V				
263		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine		٧			٧	
264		Flaws in manufacturer quality control process - Autothrottle system in the engine.		V			V	
265		Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.		V			V	
266		Unintuitive and / or error prone system manual - ECAM		V				
267		Descent above desired descent profile		V				V
268		DME / ILS DME confusion in assessing the final descent point / FAF		٧				٧
269		Flaws in manufacturer quality control process - Engine sensors		V				
270		Flaws in aircraft system maintenance process definition - Engine sensors		٧				
271		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine sensors		٧				



	Safety Performance	Discourage		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
272		Lack of adherence to AFM in terms of emergency procedures - fire detection and extinguishing procedure		٧				
273		Go-around attempt after thrust reversers deployment		٧				V
274		Lack of adherence to AFM limitations for landing		٧				٧
275		Lack of adherence to AFM in terms of emergency procedures - stall recovery		V			V	-
276		Incorrect use of automation - TOCW System					V	-
277		Flaws in aircraft system maintenance process definition - TOCW System					V	
278		Unintuitive and / or error prone system manual - TOCW					V	
279		Inadequate effectivenes of fire extinguishing system		V				
280		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System					V	
281		Unintuitive and / or error prone system manual - fire extinguishing system		٧				
282		Excessive pitch attitude		٧				
283		Excessive bank angle		V				
284		Lack of adherence to the SOP in terms of critical maneuvre execution		٧				
285		Difference indications of independent aircraft speed / altitude or attitude indicators		V				
286		Lack of adherence to SOP in terms of safety best practices		٧				
287		Flaws in aircraft system maintenance process definition - ADI system components		٧				
288		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ADI system components		٧				
289		Flaws in manufacturer quality control process - ADI system components		٧				
290		Flaws in aircraft system maintenance process definition - stickshaker		٧	٧		V	
291		Flight below maneuvering speeds		V				
292		Navigation deviation					٧	
293		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - stickshaker system components		٧			٧	
294		Lack of adherence to SOP in terms of awareness on supporting systems warning - stickshaker		V			V	
295		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.					٧	
296		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.					V	
297		Flaws in manufacturer quality control process - Communication equipment systems and components.					V	l



No. Indicators Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Rudder components.	2	3	4	5	6
with requirements - Rudder components. Flaws in aircraft system maintenance process definition - Rudder components. Flaws in manufacturer quality control process - Rudder components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Horizontal stabilizer components. Flaws in aircraft system maintenance process definition - Horizontal stabilizer components. Flaws in manufacturer quality control process - Horizontal stabilizer components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Thrust reverse system in the engine. Flaws in manufacturer quality control process - Thrust reverse system in the engine. Flaws in aircraft system maintenance process definition - Thrust reverse system in the engine. Flaws in aircraft system maintenance process definition - Thrust reverse system in the engine. Poor application of T/O & RTO procedure, aircraft handling Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum	V V V V				
Flaws in manufacturer quality control process - Rudder components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Horizontal stabilizer components. Flaws in aircraft system maintenance process definition - Horizontal stabilizer components. Flaws in manufacturer quality control process - Horizontal stabilizer components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Thrust reverse system in the engine. Flaws in manufacturer quality control process - Thrust reverse system in the engine. Flaws in aircraft system maintenance process definition - Thrust reverse system in the engine. Poor application of T/O & RTO procedure, aircraft handling Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum	V			 	ļ
Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Horizontal stabilizer components. Flaws in aircraft system maintenance process definition - Horizontal stabilizer components. Flaws in manufacturer quality control process - Horizontal stabilizer components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Thrust reverse system in the engine. Flaws in manufacturer quality control process - Thrust reverse system in the engine. Flaws in aircraft system maintenance process definition - Thrust reverse system in the engine. Poor application of T/O & RTO procedure, aircraft handling Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum	V			'	1
with requirements - Horizontal stabilizer components. Flaws in aircraft system maintenance process definition - Horizontal stabilizer components. Flaws in manufacturer quality control process - Horizontal stabilizer components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Thrust reverse system in the engine. Flaws in manufacturer quality control process - Thrust reverse system in the engine. Flaws in aircraft system maintenance process definition - Thrust reverse system in the engine. Poor application of T/O & RTO procedure, aircraft handling Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum	V			, !	
Flaws in manufacturer quality control process - Horizontal stabilizer components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Thrust reverse system in the engine. Flaws in manufacturer quality control process - Thrust reverse system in the engine. Flaws in aircraft system maintenance process definition - Thrust reverse system in the engine. Poor application of T/O & RTO procedure, aircraft handling Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum					
Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Thrust reverse system in the engine. Flaws in manufacturer quality control process - Thrust reverse system in the engine. Flaws in aircraft system maintenance process definition - Thrust reverse system in the engine. Poor application of T/O & RTO procedure, aircraft handling Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum	V				
with requirements - Thrust reverse system in the engine. Flaws in manufacturer quality control process - Thrust reverse system in the engine. Flaws in aircraft system maintenance process definition - Thrust reverse system in the engine. Poor application of T/O & RTO procedure, aircraft handling Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum					
306 Flaws in aircraft system maintenance process definition - Thrust reverse system in the engine. 307 Poor application of T/O & RTO procedure, aircraft handling 308 Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum	V				
Poor application of T/O & RTO procedure, aircraft handling Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum	V				
Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum	٧				
presence / or runway surface friction rate below minimum				V	
Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing	٧			٧	٧
				V	
310 Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.				V	
311 Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT)				V	
Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - antiice fluid HOT				V	
Applied de-icing / anti-icing method is not sufficient for predicted conditions				٧	
314 Lack of adherence to SOP in terms of aircraft icing (condition) monitoring				V	
315 Error in calculation of necessary amount of fuel	٧				٧
316 Tailwind component above limit					٧
317 Long / floating flare					٧
318 Incorrect or confusing / misleading ATC instructions	٧	V			
Poor application of T/O & RTO procedure, braking initiation sequence				V	
320 Lack of adherence to SOP for GND movements.	٧				
321 Gross error in takeoff weight entry and/or in V1 / VR speeds assessment				٧	
High energy RTO rate is an indicator of improper Operator's policy for T/O operations.				٧	
323 Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain)		V			



	Safety Performance	Precursors		Ор	eration	al issu	e	
No.	Indicators	Precuisors	1	2	3	4	5	6
324		Premature descent to DA(H) before G/S intercept or premature descent to MDA(H) before final-descent-point / FAF			V			
325		Premature descent below MDA(H) before reaching the visual-descent-point (VDP)			V			
326		Flight below desired flight path during initial and/or final approach			٧			
327		Continued approach, when below DA(H) or MDA(H), after loss of visual references			V			
328		Late or inadequate response to MSAW warning			V			
329		Failure to go-around, when so required			V			
330		Failure to follow published missed-approach procedure			V			
331		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of MSAW system.			V			
332		Lack of adherence to emergency procedures - flight deck smoke procedure		V				
333		Lack of adherence to the SOP in terms of critical maneuvre execution - flare		٧				
334		Extreme operation condition / poor maintenance quality / advanced life lenght		V				
335		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components		V				
336		Flaws in aircraft system maintenance process definition - Aircraft door system and / or components		V				
337		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MSAW System			٧			
338		Lack of adherence to the current technology standards in terms of flight safety and efficiency - engines location.		V				
339		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. MSAW warning.			V			
340		Flaws in manufacturer quality control process - CPCS system and / or components		٧				
341		Flaws in aircraft system maintenance process definition - CPCS system and / or components		٧				
342		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - CPCS system and / or components		٧				
343		Incorrect use of automation - CPCS		V				
344		Late activation of pedal braking or takeover from autobrake, when so required		V				V
345		Delayed selection of reverse thrust		٧				٧
346		Late thrust reduction or power-on touchdown		V				٧
347		Failure to arm ground-spoilers		V				٧
348		Inappropriate selection of autobrake mode for given runway length and condition		V				٧
349		Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling		V			V	
350		Use of non-standard phraseology by pilot flying (PF) and/or pilot not flying (PNF)		٧				



	Safety Performance	Precursors		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
351		Lack of adherence to SOP in terms of necessary amount of fuel		V	l			V
352		Poor application of T/O & RTO procedure, computation of T/O parameters					V	
353		Lack of adherence to emergency procedures - recovery from severe FCS failure		٧				
354		Lack of adherence to AFM in terms of emergency procedures - engine failure		٧				
355		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine fuel distribution system		٧				
356		Flaws in manufacturer quality control process - Engine fuel distribution system		٧				
357		Flaws in aircraft system maintenance process definition - Engine fuel distribution system		٧				
358		Inadequate stall recovery procedure for the aircraft					V	
359		Unintuitive and / or error prone system manual - ground radar.					٧	
360		Flaws in manufacturer quality control process - TOCW system components					٧	
361		Lack of adherence to SOP for approach and landing		V				
362		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment		V				
363		Flaws in manufacturer quality control process - Stickshaker system components					٧	
364		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS			V			
365		Flaws in aircraft system maintenance process definition - GPWS system components			V			
366		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - GPWS system components			V			
367		Flaws in manufacturer quality control process - GPWS system components			V			
131	Rate of MSAW warnings/flight	Pilot tiredness - Inadequate workload distribution		٧	V	V	V	٧
132		Flaws in pilot requirements definition process and/or training methodology		V	V	V	V	V
133		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology		٧	V		V	V
134		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution		٧	V		V	V
135		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties		٧	V	V		٧
136		Incorrect use of automation - FMS		V	V			٧
137		Unintuitive and / or error prone system manual - FMS		٧	V			٧
138		Lack of adherence to SOP in terms of approach and landing		٧	V			٧
139		Lack of adherence to the SOP in terms of critical indicators cross-checking		٧	V			



	Safety Performance	Dragingons		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
140		Flaws in CRM training procedures		٧	V			V
141		Lack of adherence to the main CRM rules		V	V			V
142		Aggressive maneuvering / overcontrolling		٧				V
143		Flaws in traffic controller requirements definition process and/or training methodology		٧	V	٧		V
144		Traffic controller tiredness - Inadequate workload distribution		V	V	V		V
145		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.		V			V	
146		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).		V	V			٧
147		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fuel system components		V				
148		Flaws in aircraft system maintenance process definition - Fuel system compoonents		٧				
149		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		٧			V	٧
150		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.		V	V			V
151		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components		V				
152		Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport in the case of adverse weather.		V				V
153		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)			V	V	٧	
154		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components			V	٧	٧	
155		Flaws in manufacturer quality control process - Onboard navigational systems and components.			V	V	V	
156		Lack of or poor communication quality			V	V	V	
157		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path		٧				٧
158		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)			V	٧	V	
159		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)			V	٧	٧	
160		Flaws in manufacturer quality control process - Engine systems and / or components		٧				
161		Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing		٧				٧
162		Lack of English proficiency		٧	V	٧		
163		Use of non-standard phraseology by pilot and/or controller		V	V	V		



	Safety Performance	Decourage	T	Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
164		Inadequate aircraft de-icing / anti-icing		V			٧	
165		Altimeter setting error			V	V		
166		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver			V	V		
167		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Integrity of primary aircraft structure.		٧				
168		Flaws in manufacturer quality control process - Integrity of primary aircraft structure.		V				
169		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring		V				
170		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		V				
171		Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.		V				
172		Lack of adherence to SOP in terms of AFM limitations		V				
173		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.		٧			V	
174		Flaws in aircraft system maintenance process definition - Components of Wing control surface system.		V			V	
175		Flaws in manufacturer quality control process - Components of Wing control surface system.		V			٧	
176		Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure		V				٧
177		Flaws in manufacturer quality control process - Fuel system components.		V				
178		Lack of adherence to emergency procedures - control recovery		V				٧
179		Lack of adherence to SARPs in terms of avoiding adverse weather conditions during flight		V				
180		Flaws in manufacturer quality control process - Landing gear components.		V				
181		Flaws in aircraft system maintenance process definition - Landing gear components.		V				
182		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components		٧			V	
183		Flaws in aircraft system maintenance process definition - APU systems and / or components		V			V	
184		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine anti-ice systems and / or components		٧				
185		Flaws in manufacturer quality control process - Engine anti-ice system and / or components		V				
186		Flaws in aircraft system maintenance process definition - Engine anti-ice system and / or components		V				
187		Incorrect use of automation -Engine anti-ice system		٧				
188		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.			٧		V	
189		Inadequate de-icing method applied		V			, ,	



	Safety Performance	Precursors		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
190		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ECAM (or similar) system components.		V				
191		Lack of adherence to emergency procedures - Fuel starvation		V				
192		Flaws in aircraft system maintenance process definition - ECAM (or similar) system components.		V				
193		Unintuitive and / or error prone system manual - Engine anti-icing system		V				
194		Lack of adherence to SOP in terms of de-icing / anti-icing procedures.		V				
195		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ECAM.		V				
196		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Reduction gear in the engine		V				
197		Flaws in manufacturer quality control process - Reduction gear in the engine.		٧				
198		Flaws in aircraft system maintenance process definition - Reduction gear in the engine.		V				
199		Flaws in manufacturer quality control process - ECAM (or similar) system components.		V				
200		Flaws in manufacturer quality control process - Fire extinguishing system components		V		V	V	
201		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Compressor in the engine		٧				
202		Flaws in manufacturer quality control process - Compressor in the engine.		V				
203		Flaws in aircraft system maintenance process definition - Compressor in the engine.		V				
204		Flaws in manufacturer quality control process - Engine accessory drive components.		V				
205		Flaws in aircraft system maintenance process definition - Engine accessory drive components.		V				
206		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine accessory drive components.		٧				
207		Flaws in aircraft system maintenance process definition - Oil distribution system		V				
208		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Oil distribution system		٧				
209		Flaws in manufacturer quality control process - Oil distribution system		V	1			ł
210		Flaws in manufacturer quality control process - APU systems and / or components		V				
211		Flaws in aircraft system maintenance process definition - Engine combustor		V				
212		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine combustor		٧				
213		Flaws in manufacturer quality control process - Engine combustor		V				
214		Flaws in aircraft system maintenance process definition - Engine turbine components		V				1



	Safety Performance	Discourse		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
215		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine turbine components		V				
216		Flaws in manufacturer quality control process - Engine turbine components		V				
217		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS)			٧			
218		Failure to check navigation accuracy before approach			٧			
219		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. Navigational aid failure.			٧			
220		Not recognized ground Navaids System failure not reflected in NOTAM messages			V		1	
221		Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS)			V		 	
222		Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS)			V		 	
223		Current airport diagram not reflecting critical changes			V		 	
224		Lack of adherence to SOP for AIR operations in terms of controller error in approach clearence instruction			V			
225		Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination			V			
226		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components		V			٧	
227		Flaws in aircraft system maintenance process definition - Hydraulic System		V			V	
228		Navigation deviation				V	V	
229		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.				V	V	
230		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.				٧	٧	
231		Flaws in manufacturer quality control process - Communication equipment systems and components.				V	V	
232		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components		V			٧	
233		Flaws in aircraft system maintenance process definition - Fire detection system components		V			V	
234		Flaws in manufacturer quality control process - Fire detection system components		V			V	
235		Flaws in aircraft system maintenance process definition - Fire warning system		V			V	
236		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system		V			٧	
237		Flaws in manufacturer quality control process - Fire warning system		V			٧	
238		Incorrect or confusing / misleading ATC instructions		V	V	V		
239		Flaws in aircraft system maintenance process definition - Electrical wiring System		V				



	Safety Performance	Discourse		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
240		Separation of structural element / component of the aircraft during take-off or landing		V				
241		Flaws in aircraft system maintenance process definition - Engine systems and / or components		V				
242		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Electrical / wiring system components		٧				
243		Flaws in manufacturer quality control process - Electrical / wiring systems components		V				
244		Lack of adherence to SOP in terms of fuelling procedure		V				
245		Inadequate maintenance of fire vulnerable aircraft parts or components		V				
246		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements in terms of fire resistance		٧				
247		Lack of adherence to regulations concerning transport of DGR goods		V				
248		Lack of adherence to engine limitations		V				
249		Lack of adherence to SOP for take-off procedure in terms of altimeter callibration.				V		
250		Hearback ommitted				V		
251		Lack of adherence to Rules of the Air - adherence to Controller clearance				V		
252		Tactical or / and Planning Controller tiredness - Inadequate workload distribution				V		
253		Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology				V		
254		Unintuitive and / or error prone system manual - communication equipment.				V		
255		Altitude deviation				V		
256		Level bust (pilot lapse or late re-clearance by ATC)				V		
257		Failure to comply with an altitude or speed restriction / constraint				V		
258		Inadequate coordination between ATM centers and/or ATC sectors				V		
259		Flaws in Airspace and Air Traffic planning procedures design process				V		
260		Flaws in conflict and separation minima infringement detection / elimination procedures				V		
261		Lack of adherence of airlines to time contraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data.				V		
262		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MTCD System				V		
263		Lack of adherence of airlines to declared Flight Plan.				V		
264		Failure to identify the pre-tactical conflict before it reach the tactical controller				V		
265		Lack of adherence to SOP for Airborne operation in terms of minimum seprataion				V		



	Safety Performance	Descriptions		Ор	eration	al issu	<u> </u>	
No.	Indicators	Precursors	1	2	3	4	5	6
266		Incorrect use of communication equipment				V		1
267		Military activity in controlled airport or located within controlled area				V		
268		General aviation activity in controlled airport or located within controlled area				V		
269		Intensified traffic related to general aviation activity e. g. over GA airport / airfield				V		
270		Deviation from flight trajectory commanded by controller				V		
271		High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,)		٧				٧
272		Late deceleration and configuration set-up for approach and landing		V				٧
273		DME / ILS DME confusion in assessing the final descent point / FAF		V				V
274		Unstabilized final approach (high, fast, steep,)		V				٧
275		Unintuitive and / or error prone system manual - CPCS		V			V	٧
276		Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared		V				٧
277		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System.		V				٧
278		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of fire detection / warning or / and extinguishing system.		٧				
279		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system		V				V
280		Flaws in manufacturer quality control process - PWS system components		V				V
281		Imbalanced and inaproppriate relation between cpt and his subordinates			V			
282		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.		V				٧
283		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - LLWAS system		٧				٧
284		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components		V			٧	
285		Flaws in aircraft system maintenance process definition - Fire extinguishing system components		V			V	
286		Descent above desired descent profile		V				٧
287		Lack of adherence to AFM limitations for landing		V				٧
288		Lack of adherence to AFM in terms of emergency procedures - engine restart procedure		٧				
289		Lack of adherence to SOP in terms of awareness on supporting systems warning		٧				·
290		Unintuitive and / or error prone system manual - ECAM		٧				
291		Flaws in manufacturer quality control process - Engine sensors		٧				



	Safety Performance	Discourage	Operational issue					
No.	Indicators	Precursors	1	2	3	4	5	6
292		Flaws in aircraft system maintenance process definition - Engine sensors		٧				
293		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine sensors		٧				
294		Lack of adherence to emergency procedures - WEM		V				V
295		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of STCA System.				٧		
296		Lack of adherence to regulations concerning independent ATCO monitoring				V		
297		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - STCA System				٧		
298		Lack of adherence to AFM in terms of emergency procedures - fire detection and extinguishing procedure		٧				
299		Go-around attempt after thrust reversers deployment		V				V
300		Inadequate effectivenes of fire extinguishing system		V				
301		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine fuel distribution system		٧				
302		Flaws in manufacturer quality control process - Engine fuel distribution system		٧				
303		Flaws in aircraft system maintenance process definition - Engine fuel distribution system		V				
304		Unintuitive and / or error prone system manual - fire extinguishing system		V				
305		Excessive pitch attitude		V				
306		Excessive bank angle		V				
307		Lack of adherence to the SOP in terms of critical maneuvre execution		V				
308		Lack of adherence to SOP in terms of AFM limitations in terms of weigh and balance		V				
309		Difference indications of independent aircraft speed / altitude or attitude indicators		V				
310		Lack of adherence to SOP in terms of safety best practices		V				
311		Flaws in aircraft system maintenance process definition - ADI system components		V				
312		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ADI system components		٧				
313		Flaws in manufacturer quality control process - ADI system components		V				
314		Lack of adherence to SOP in terms of load sheet preparation and verification		٧				
315		Lack of adherence to the current technology standards in terms of flight safety and efficiency - fuel tank allocation.		V				
316		Lack of adherence to AFM in terms of emergency procedures - stall recovery		V				
317		Lack of adherence to AFM limitations for Take-off		V				



	Safety Performance	Durannana		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
318		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components					٧	
319		Flaws in manufacturer quality control process - Power supply system components					٧	
320		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine					٧	
321		Flaws in manufacturer quality control process - Autothrottle system in the engine.					٧	
322		Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.					٧	
323		Tailwind component above limit						٧
324		Lack of adherence to SOP in terms of pre-flight inspections - cargo securing quality		V				
325		Error in calculation of necessary amount of fuel		V				٧
326		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum		٧			٧	٧
327		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					V	
328		Poor application of T/O & RTO procedure, failure recognition and preparedness					٧	
329		Lack of adherence to SOP for GND movements.		٧				
330		Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain)			V			
331		Premature descent to DA(H) before G/S intercept or premature descent to MDA(H) before final-descent-point / FAF			V			
332		Premature descent below MDA(H) before reaching the visual-descent-point (VDP)			V			
333		Flight below desired flight path during initial and/or final approach			V			
334		Continued approach, when below DA(H) or MDA(H), after loss of visual references			V			
335		Late or inadequate response to MSAW warning			V			
336		Failure to go-around, when so required			V			
337		Failure to follow published missed-approach procedure			V			
338		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of MSAW system.			V			
339		Lack of adherence to emergency procedures - flight deck smoke procedure		V				
340		Lack of adherence to AFM in terms of emergency procedures - windshear recovery		٧				
341		Lack of adherence to the SOP in terms of critical maneuvre execution - flare		٧				
342		Extreme operation condition / poor maintenance quality / advanced life lenght		٧				
343		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components		٧				



	Safety Performance	D		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
344		Flaws in aircraft system maintenance process definition - Aircraft door system and / or components		٧				
345		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MSAW System			٧			
346		Lack of adherence to the current technology standards in terms of flight safety and efficiency - engines location.		V				
347		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. MSAW warning.			V			
348		Flaws in manufacturer quality control process - CPCS system and / or components		V				
349		Flaws in aircraft system maintenance process definition - CPCS system and / or components		V				
350		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - CPCS system and / or components		V				
351		Incorrect use of automation - CPCS		V				
352		Late activation of pedal braking or takeover from autobrake, when so required		V				٧
353		Delayed selection of reverse thrust		V				٧
354		Late thrust reduction or power-on touchdown		٧				٧
355		Failure to arm ground-spoilers		V				٧
356		Inappropriate selection of autobrake mode for given runway length and condition		٧				٧
357		Use of non-standard phraseology by pilot flying (PF) and/or pilot not flying (PNF)		٧				
358		Lack of adherence to SOP in terms of necessary amount of fuel		٧				٧
359		Lack of adherence to AFM in terms of emergency procedures - engine failure		٧				
360		Flaws in aircraft system maintenance process definition - stickshaker			V			
361		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment					V	
362		Poor application of T/O & RTO procedure, braking initiation sequence					V	
363		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.					٧	
364		Lack of adherence to SOP for approach and landing		V				
365		Poor application of T/O & RTO procedure, computation of T/O parameters					٧	
366		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ACAS system components				٧		
367		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS			V			
368		Inappropriate visual avoidance maneuver				٧		
369		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ACAS installed on aircraft.				٧		



	Safety Performance	Drocursors		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
370		Late or inadequate response to ACAS warning				V		
371		Flaws in aircraft system maintenance process definition - GPWS system components			V			
372		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - GPWS system components			٧			
373		Flaws in manufacturer quality control process - GPWS system components			V			
131	Rate of misuse of automation events/flight	Pilot tiredness - Inadequate workload distribution		V				٧
132		Flaws in pilot requirements definition process and/or training methodology		V				V
133		Lack of adherence to SOP in terms of approach and landing		V				V
134		Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing		V				V
135		Flaws in CRM training procedures		V				V
136		Lack of adherence to the main CRM rules		٧				V
137		Incorrect use of automation - FMS		V				V
138		Unintuitive and / or error prone system manual - FMS		V				V
139		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path		V				٧
140		Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport in the case of adverse weather.		٧				٧
141		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.		V				V
142		Lack of adherence to emergency procedures - control recovery		V				V
143		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties		٧				٧
144		Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure		V				V
145		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology		V				V
146		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution		V				V
147		Aggressive maneuvering / overcontrolling		V				V
148		High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,)		V				٧
149		Late deceleration and configuration set-up for approach and landing		٧				V
150		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components						٧



	Safety Performance	Discourage	T	Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
151		Descent above desired descent profile						٧
152		DME / ILS DME confusion in assessing the final descent point / FAF						V
153		Unstabilized final approach (high, fast, steep,)						٧
154		Go-around attempt after thrust reversers deployment		V				V
155		Lack of adherence to AFM limitations for landing		V				٧
156		Unintuitive and / or error prone system manual - CPCS		V				V
157		Lack of adherence to SOP in terms of de-icing / anti-icing procedures.						
158		Incorrect use of automation - Anti-icing system						
159		Unintuitive and / or error prone system manual - Anti-icing system						
160		Late activation of pedal braking or takeover from autobrake, when so required		V				٧
161		Delayed selection of reverse thrust		V				٧
162		Inappropriate selection of autobrake mode for given runway length and condition		V				٧
163		Inadequate aircraft de-icing / anti-icing		V				
164		Excessive pitch attitude						
165		Lack of adherence to the SOP in terms of critical indicators cross-checking						
166		Lack of adherence to SOP in terms of aircraft icing (condition) monitoring		V				
167		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Anti-icing system components						
168		Flaws in manufacturer quality control process - Anti-icing system components						
169		Flaws in aircraft system maintenance process definition - Anti-icing systems components						
170		Unintuitive and / or error prone system manual - On-board weather radar.						
171		Incorrect use of automation - On-board weather radar						
172		Traffic controller tiredness - Inadequate workload distribution						
173		Flaws in traffic controller requirements definition process and/or training methodology						
174		Lack of adherence to SOP in terms of requested information support for other aircraft in terms of adverse weather conditions						
175		Lack of adherence to SARPs in terms of avoiding adverse weather conditions during flight						
176		Incorrect weather report obtained by the flight crew						
177		Lack of adherence to SOP in terms of providing flight crew with current weather report						



	Safety Performance	Discourage	T	Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
178		Lack of adherence to SOP in terms of application of findings from weather report						
179		Lack of adherence of passengers to the recommendation: Fasten seat belt while seated						
180		Lack of adherence to SOP in terms of "fasten your seat belt" information activation in passenger cabin during flight in turbulence conditions						
181		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Integrity of primary aircraft structure.						
182		Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.						
183		Flaws in manufacturer quality control process - Integrity of primary aircraft structure.						
184		Inadequate airline / regulatory provider policy in terms of aware of the risks related to air travel						
185		Inappropriate use of differential reverse thrust						٧
186		Inadequate use of differential braking						٧
187		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - On-board weather radar						
188		Flaws in manufacturer quality control process - On-board weather radar						
189		Flaws in aircraft system maintenance process definition - On-board weather radar						
190		Flaws in manufacturer quality control process - Landing gear components.						
191		Flaws in aircraft system maintenance process definition - Landing gear components.						
192		Failure to remember / assess crosswind component limit for prevailing runway condition						٧
193		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FCS system or components						
194		Flaws in manufacturer quality control process - FCS system components						
195		Flaws in aircraft system maintenance process definition - FCS systems or components						
196		Inadequate crosswind landing / decrab technique						٧
197		Touchdown off centerline						٧
198		Use of nose wheel steering tiller during rollout						٧
199		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure						٧
200		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.						٧
201		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring		V				٧
202		Failure to arm ground-spoilers						٧
203		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum						V



	Safety Performance	Precursors		V V V V V V V V V V V V V V V V V V V				
No.	Indicators	Precursors	1	2	3	4	5	6
204		Lack of adherence to AFM in terms of emergency procedures - stall recovery		V		ļ	'	1
205		Late thrust reduction or power-on touchdown						V
206		Error in calculation of necessary amount of fuel		V				V
207		Lack of adherence to SOP in terms of necessary amount of fuel		V				V
131	Rate of near-stall events/flight	Pilot tiredness - Inadequate workload distribution		٧			V	٧
132		Flaws in pilot requirements definition process and/or training methodology		V			V	٧
133		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology		V			V	V
134		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution		V			V	V
135		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties		٧			V	٧
136		Aggressive maneuvering / overcontrolling		V				٧
137		Inadequate aircraft de-icing / anti-icing		V			V	
138		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		٧			V	٧
139		Lack of adherence to the SOP in terms of critical indicators cross-checking		V				
140		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.		V			٧	
141		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring		V			٧	
142		Lack of adherence to SOP in terms of de-icing / anti-icing procedures.		V			٧	
143		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		V			٧	
144		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components		٧			٧	
145		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Integrity of primary aircraft structure.		٧				
146		Flaws in manufacturer quality control process - Integrity of primary aircraft structure.		V				
147		Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.		V				
148		Flaws in manufacturer quality control process - Engine systems and / or components		V			٧	
149		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.		٧			٧	
150		Flaws in aircraft system maintenance process definition - Components of Wing control surface system.		V			V	
151		Flaws in manufacturer quality control process - Components of Wing control surface system.		V			V	



	Safety Performance	Descriptions		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
152		Lack of adherence to SARPs in terms of avoiding adverse weather conditions during flight		٧				
153		Lack of adherence to SOP in terms of AFM limitations		٧				
154		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fuel system components		٧				
155		Flaws in aircraft system maintenance process definition - Fuel system compoonents		V				
156		Flaws in manufacturer quality control process - Fuel system components.		V				
157		Flaws in manufacturer quality control process - Landing gear components.		٧				
158		Flaws in aircraft system maintenance process definition - Landing gear components.		٧				
159		Unintuitive and / or error prone system manual - CPCS		٧			٧	٧
160		Unintuitive and / or error prone system manual - FMS		٧				V
161		Incorrect use of automation - FMS		٧				V
162		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine anti-ice systems and / or components		V				
163		Flaws in manufacturer quality control process - Engine anti-ice system and / or components		V				
164		Flaws in aircraft system maintenance process definition - Engine anti-ice system and / or components		٧				
165		Incorrect use of automation -Engine anti-ice system		٧				
166		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Reduction gear in the engine		٧				
167		Flaws in manufacturer quality control process - Reduction gear in the engine.		V				
168		Flaws in aircraft system maintenance process definition - Reduction gear in the engine.		٧				
169		Inadequate de-icing method applied		٧				
170		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Compressor in the engine		٧				
171		Flaws in manufacturer quality control process - Compressor in the engine.		٧				
172		Flaws in aircraft system maintenance process definition - Compressor in the engine.		٧				
173		Flaws in manufacturer quality control process - Engine accessory drive components.		٧				
174		Flaws in aircraft system maintenance process definition - Engine accessory drive components.		٧				
175		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine accessory drive components.		V				
176		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ECAM (or similar) system components.		٧				



	Safety Performance	Discourage		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
177		Lack of adherence to emergency procedures - Fuel starvation		٧				
178		Flaws in aircraft system maintenance process definition - Oil distribution system		V				
179		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Oil distribution system		٧				
180		Flaws in manufacturer quality control process - Oil distribution system		V				
181		Flaws in aircraft system maintenance process definition - ECAM (or similar) system components.		V				
182		Unintuitive and / or error prone system manual - Engine anti-icing system		V				
183		Flaws in manufacturer quality control process - ECAM (or similar) system components.		V				
184		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ECAM.		V				
185		Lack of adherence to SOP in terms of approach and landing		V				٧
186		Flaws in aircraft system maintenance process definition - Engine combustor		V				
187		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine combustor		٧				
188		Flaws in manufacturer quality control process - Engine combustor		V				
189		Flaws in aircraft system maintenance process definition - Engine turbine components		V				
190		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine turbine components		٧				
191		Flaws in manufacturer quality control process - Engine turbine components		V				
192		Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing		V				٧
193		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path		٧				٧
194		Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport in the case of adverse weather.		٧				٧
195		Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure		V				V
196		Flaws in CRM training procedures		V				٧
197		Lack of adherence to the main CRM rules		V				٧
198		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.		٧				٧
199		Lack of adherence to emergency procedures - control recovery		V				٧
200		Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.					V	
201		Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.					V	



	Safety Performance	Precursors		Ор	eration	al issu	e	·
No.	Indicators	riecuisuis	1	2	3	4	5	6
202		Unintuitive and / or error prone system manual - FMC					V	1
203		Incorrect stab-trim setting					٧	
204		Undetected incorrect takeoff configuration					V	
205		Difference indications of independent aircraft speed / altitude or attitude indicators		V				
206		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Anti-icing system components		٧				
207		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components		V			V	
208		Flaws in aircraft system maintenance process definition - APU systems and / or components		V			V	<u>L</u>
209		Excessive pitch attitude		V				
210		Excessive bank angle		V				
211		Flaws in manufacturer quality control process - Anti-icing system components		V				
212		Flaws in aircraft system maintenance process definition - Anti-icing systems components		V				
213		Flaws in aircraft system maintenance process definition - Engine systems and / or components		V			V	
214		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					V	
215		Lack of adherence to AFM in terms of emergency procedures - stall recovery		V			V	
216		Flaws in manufacturer quality control process - Power supply system components		V			V	
217		High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,)		٧				٧
218		Late deceleration and configuration set-up for approach and landing		V				V
219		Unstabilized final approach (high, fast, steep,)		V				V
220		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components					V	
221		Lack of adherence to SOP in terms of aircraft icing (condition) monitoring		V			V	
222		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)		٧			٧	
223		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)		V			٧	
224		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine		٧			V	
225		Flaws in manufacturer quality control process - Autothrottle system in the engine.		V			٧	
226		Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.		٧			٧	



	Safety Performance	Discourage		Ор	eration	al issu	е	
No.	Indicators	Precursors	1	2	3	4	5	6
227		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)		V			٧	
228		Lack of adherence to AFM in terms of emergency procedures - engine restart procedure		V				
229		Flaws in manufacturer quality control process - APU systems and / or components		V				
230		Traffic controller tiredness - Inadequate workload distribution		V				
231		Flaws in traffic controller requirements definition process and/or training methodology		V				
232		Poor application of T/O & RTO procedure, failure recognition and preparedness					٧	
233		Lack of adherence to SOP in terms of awareness on supporting systems warning		V				
234		Unintuitive and / or error prone system manual - ECAM		V				
235		Descent above desired descent profile		V				V
236		DME / ILS DME confusion in assessing the final descent point / FAF		V				V
237		Flaws in manufacturer quality control process - Engine sensors		٧				
238		Flaws in aircraft system maintenance process definition - Engine sensors		V				
239		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine sensors		V				
240		Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.		٧			V	
241		Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT)		V			٧	
242		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - antiice fluid HOT		٧			٧	
243		Flaws in aircraft system maintenance process definition - Electrical wiring System		V			٧	
244		Lack of adherence to SOP in terms of safety best practices		V				
245		Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing		٧			V	
246		Lack of adherence to AFM limitations for landing		٧				V
247		Flaws in aircraft system maintenance process definition - ADI system components		V				
248		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ADI system components		٧				
249		Flaws in manufacturer quality control process - ADI system components		V				
250		Incorrect use of automation - TOCW System					٧	
251		Flaws in aircraft system maintenance process definition - TOCW System					٧	
252		Unintuitive and / or error prone system manual - TOCW					٧	
253		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude,		V				



	Safety Performance	Descriptions		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
		approach path parameters and obstacles locations (e.g. mountains).						
254		Lack of adherence to the SOP in terms of critical maneuvre execution		V				
255		Applied de-icing / anti-icing method is not sufficient for predicted conditions		V			٧	
256		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System					٧	
257		Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination		٧				
258		Incorrect use of automation - Anti-icing system		V				
259		Unintuitive and / or error prone system manual - Anti-icing system		V				
260		Lack of adherence to SOP in terms of pre-flight inspections -presence of anti-contamination covers on pitot static tube		V				
261		Lack of adherence to SOP in terms of briefing and checklist before initiating of start of taxiing and take-off		V				
262		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Pitot static system components		V				
263		Flaws in manufacturer quality control process - Pitot static system components		V				
264		Flaws in aircraft system maintenance process definition - Pitot static systems components		٧				
265		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ADI		٧				
266		Flaws in manufacturer quality control process - ADI		V				
267		Flaws in aircraft system maintenance process definition - ADI		V				
268		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ASI		٧				
269		Flaws in manufacturer quality control process - ASI		V				
270		Flaws in aircraft system maintenance process definition - ASI		V				
271		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine fuel distribution system		V				
272		Flaws in manufacturer quality control process - Engine fuel distribution system		V				
273		Flaws in aircraft system maintenance process definition - Engine fuel distribution system		V				
274		Lack of adherence to AFM limitations for Take-off		V				
275		Lack of adherence to SOP in terms of requested information support for other aircraft in terms of adverse weather conditions		V				
276		Lack of adherence to SOP in terms of application of findings from weather report		٧				
277		Lack of adherence to SOP in terms of AFM limitations in terms of weigh and balance		V			 	



	Safety Performance	Precursors		Ор	eration	al issu	e	
No.	Indicators	Precuisors	1	2	3	4	5	6
278		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PFD		V				
279		Flaws in manufacturer quality control process - PFD		V				
280		Flaws in aircraft system maintenance process definition - PFD		V				
281		Flaws in aircraft system maintenance process definition - stickshaker		V			٧	
282		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - stickshaker system components		V			٧	
283		Flight below maneuvering speeds		V				
284		Lack of adherence to SOP in terms of awareness on supporting systems warning - stickshaker		V			٧	
285		Incorrect weather report obtained by the flight crew		V				
286		Lack of adherence to SOP in terms of providing flight crew with current weather report		V				
287		Lack of adherence to SOP in terms of load sheet preparation and verification		V				
288		Lack of adherence to the current technology standards in terms of flight safety and efficiency - fuel tank allocation.		V				
289		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components					V	
290		Flaws in aircraft system maintenance process definition - Hydraulic System					V	
291		Lack of adherence to emergency procedures - recovery from severe FCS failure		V				
292		Unintuitive and / or error prone system manual - On-board weather radar.		V				
293		Incorrect use of automation - On-board weather radar		V				
294		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - On-board weather radar		V				
295		Flaws in manufacturer quality control process - On-board weather radar		V				
296		Flaws in aircraft system maintenance process definition - On-board weather radar		V				
297		Flaws in aircraft system maintenance process definition - Fire detection system components					V	
298		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components					V	
299		Flaws in manufacturer quality control process - Fire detection system components					٧	
300		Flaws in aircraft system maintenance process definition - Fire warning system					٧	
301		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system					٧	
302		Flaws in manufacturer quality control process - Fire warning system					V	



	Safety Performance	Ducasina		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
303		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components					٧	
304		Flaws in aircraft system maintenance process definition - Fire extinguishing system components					٧	
305		Flaws in manufacturer quality control process - Fire extinguishing system components					V	
306		Lack of or poor communication quality					V	
307		Lack of adherence of passengers to the recommendation: Fasten seat belt while seated		V				
308		Lack of adherence to SOP in terms of "fasten your seat belt" information activation in passenger cabin during flight in turbulence conditions		V				
309		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.					٧	
310		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.					٧	
311		Flaws in manufacturer quality control process - Communication equipment systems and components.					٧	
312		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Rudder components.		٧				
313		Flaws in aircraft system maintenance process definition - Rudder components.		V				
314		Flaws in manufacturer quality control process - Rudder components.		V				
315		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Horizontal stabilizer components.		V				
316		Flaws in aircraft system maintenance process definition - Horizontal stabilizer components.		V				
317		Flaws in manufacturer quality control process - Horizontal stabilizer components.		V				
318		Navigation deviation					V	
319		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Thrust reverse system in the engine.		V				
320		Flaws in manufacturer quality control process - Thrust reverse system in the engine.		V				
321		Flaws in aircraft system maintenance process definition - Thrust reverse system in the engine.		V				
322		Poor application of T/O & RTO procedure, aircraft handling					V	
323		Inadequate airline / regulatory provider policy in terms of aware of the risks related to air travel		V				
324		Lack of adherence to SOP in terms of pre-flight inspections - cargo securing quality		٧				
325		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components					V	
326		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.					٧	
327		Flaws in manufacturer quality control process - Onboard navigational systems and components.					٧	1



	Safety Performance	Durannana		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
328		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum		٧			٧	٧
329		Lack of adherence to SOP in terms of pre-flight inspections - ice presence on aircraft		V				
330		Tailwind component above limit						٧
331		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FCS system or components		٧				
332		Flaws in manufacturer quality control process - FCS system components		V				
333		Flaws in aircraft system maintenance process definition - FCS systems or components		V				
334		Flaws in manufacturer quality control process - CPCS system and / or components		V				
335		Flaws in aircraft system maintenance process definition - CPCS system and / or components		V				
336		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - CPCS system and / or components		V				
337		Poor application of T/O & RTO procedure, braking initiation sequence					٧	
338		Lack of adherence to TO procedure in terms of antiice protection		V				
339		Flaws in manufacturer quality control process - anti-ice fluid specifications (HOT)		V				
340		Lack of adherence to emergency procedures - flight deck smoke procedure		٧				
341		Long / floating flare						V
342		Incorrect use of automation - CPCS		٧				
343		Lack of English proficiency		٧				
344		Incorrect or confusing / misleading ATC instructions		٧				
345		Use of non-standard phraseology by pilot and/or controller		٧				
346		Lack of adherence to SOP for GND movements.		٧				
347		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment					V	
348		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.					V	
349		Error in calculation of necessary amount of fuel		V				
350		Lack of adherence to the SOP in terms of critical maneuvre execution - flare		V				
351		Extreme operation condition / poor maintenance quality / advanced life lenght		V				
352		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components		V				
353		Flaws in aircraft system maintenance process definition - Aircraft door system and / or components		V			_ 	



	Safety Performance	Procursors		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
354		Lack of adherence to the current technology standards in terms of flight safety and efficiency - engines location.		V				
355		Late activation of pedal braking or takeover from autobrake, when so required		V				V
356		Delayed selection of reverse thrust		V				V
357		Late thrust reduction or power-on touchdown		V				V
358		Failure to arm ground-spoilers		V				V
359		Inappropriate selection of autobrake mode for given runway length and condition		V				V
360		Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling		V			٧	
361		Use of non-standard phraseology by pilot flying (PF) and/or pilot not flying (PNF)		V				
362		Poor application of T/O & RTO procedure, computation of T/O parameters					٧	
363		Flaws in manufacturer quality control process - Stickshaker system components		V			٧	
364		Lack of adherence to AFM in terms of emergency procedures - engine failure		V				
365		Inadequate stall recovery procedure for the aircraft					٧	
366		Unintuitive and / or error prone system manual - ground radar.					٧	
367		Flaws in manufacturer quality control process - TOCW system components					V	
368		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment		V				
369		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Electrical / wiring system components		٧				
370		Flaws in manufacturer quality control process - Electrical / wiring systems components		V				
131	Rate of high bank angle events/flight	Pilot tiredness - Inadequate workload distribution		٧			٧	٧
132		Flaws in pilot requirements definition process and/or training methodology		V			٧	V
133		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology		٧			٧	V
134		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution		V			٧	V
135		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties		٧			٧	٧
136		Aggressive maneuvering / overcontrolling		V				V
137		Inadequate aircraft de-icing / anti-icing		٧			٧	
138		Lack of adherence to the SOP in terms of critical indicators cross-checking		٧				
139		Unintuitive and / or error prone system manual - FMS		٧				٧
140		Incorrect use of automation - FMS		٧				V



	Safety Performance	Discourage		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
141		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		V			٧	V
142		Flaws in CRM training procedures		V			٧	٧
143		Lack of adherence to the main CRM rules		٧			٧	٧
144		Lack of adherence to SOP in terms of approach and landing		٧				٧
145		Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport in the case of adverse weather.		V				V
146		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.		V				V
147		Lack of adherence to SOP in terms of de-icing / anti-icing procedures.		٧				
148		Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing		V				٧
149		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path		V				٧
150		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring		٧			V	
151		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.		V			٧	
152		Flaws in aircraft system maintenance process definition - Components of Wing control surface system.		٧			V	
153		Flaws in manufacturer quality control process - Components of Wing control surface system.		V			٧	
154		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Integrity of primary aircraft structure.		V				
155		Flaws in manufacturer quality control process - Integrity of primary aircraft structure.		٧				
156		Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.		V				
157		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.		V			٧	
158		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		V			٧	
159		Lack of adherence to SOP in terms of AFM limitations		V				
160		Lack of adherence to SARPs in terms of avoiding adverse weather conditions during flight		V				
161		Lack of adherence to emergency procedures - control recovery		٧				٧
162		Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure		٧				٧
163		Flaws in aircraft system maintenance process definition - Landing gear components.		٧				
164		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fuel system components		V				
165		Flaws in aircraft system maintenance process definition - Fuel system compoonents		V				_



	Safety Performance	Paramatan		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
166		Flaws in manufacturer quality control process - Landing gear components.		V				
167		Flaws in manufacturer quality control process - Fuel system components.		V				
168		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Reduction gear in the engine		V				
169		Flaws in manufacturer quality control process - Reduction gear in the engine.		V				1
170		Flaws in aircraft system maintenance process definition - Reduction gear in the engine.		V				
171		Incorrect use of automation -Engine anti-ice system		V				
172		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Compressor in the engine		٧				
173		Flaws in manufacturer quality control process - Compressor in the engine.		V				
174		Flaws in aircraft system maintenance process definition - Compressor in the engine.		V				
175		Flaws in manufacturer quality control process - Engine accessory drive components.		V				
176		Flaws in aircraft system maintenance process definition - Engine accessory drive components.		٧				
177		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine accessory drive components.		V				
178		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ECAM (or similar) system components.		V				
179		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine anti-ice systems and / or components		٧				
180		Flaws in manufacturer quality control process - Engine anti-ice system and / or components		V				
181		Flaws in aircraft system maintenance process definition - Engine anti-ice system and / or components		V				
182		Flaws in aircraft system maintenance process definition - Oil distribution system		V				
183		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Oil distribution system		V				
184		Flaws in manufacturer quality control process - Oil distribution system		V				
185		Flaws in aircraft system maintenance process definition - ECAM (or similar) system components.		٧				
186		Flaws in manufacturer quality control process - ECAM (or similar) system components.		٧				
187		Lack of adherence to emergency procedures - Fuel starvation		٧				
188		Inadequate de-icing method applied		٧				
189		Unintuitive and / or error prone system manual - Engine anti-icing system		V				
190		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ECAM.		V				



	Safety Performance	Discourage		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
191		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components		٧				
192		Flaws in aircraft system maintenance process definition - Engine combustor		V				
193		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine combustor		٧				
194		Flaws in manufacturer quality control process - Engine combustor		V				
195		Flaws in aircraft system maintenance process definition - Engine turbine components		٧				
196		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine turbine components		٧				
197		Flaws in manufacturer quality control process - Engine turbine components		٧				
198		Flaws in manufacturer quality control process - Engine systems and / or components		V				
199		Unintuitive and / or error prone system manual - CPCS					V	٧
200		Difference indications of independent aircraft speed / altitude or attitude indicators		٧				
201		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Anti-icing system components		٧				
202		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components		٧			V	
203		Flaws in aircraft system maintenance process definition - APU systems and / or components		٧			V	
204		Excessive pitch attitude		V				
205		Excessive bank angle		V				
206		Flaws in manufacturer quality control process - Anti-icing system components		٧				
207		Flaws in aircraft system maintenance process definition - Anti-icing systems components		٧				
208		High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,)		٧				٧
209		Late deceleration and configuration set-up for approach and landing		٧				٧
210		Unstabilized final approach (high, fast, steep,)		٧				٧
211		Traffic controller tiredness - Inadequate workload distribution		V			V	
212		Flaws in traffic controller requirements definition process and/or training methodology		٧			V	
213		Lack of or poor communication quality					V	
214		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)		٧			V	
215		Lack of adherence to AFM in terms of emergency procedures - engine restart procedure	7	٧		7	7	



	Safety Performance	Discourse.		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
216		Flaws in manufacturer quality control process - APU systems and / or components		V				
217		Lack of adherence to SOP in terms of awareness on supporting systems warning		V				
218		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)		٧			٧	
219		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine		V			٧	
220		Flaws in manufacturer quality control process - Autothrottle system in the engine.		V			V	
221		Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.		V			٧	
222		Unintuitive and / or error prone system manual - ECAM		V				
223		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)		V			V	
224		Descent above desired descent profile		V				٧
225		DME / ILS DME confusion in assessing the final descent point / FAF		V				٧
226		Flaws in manufacturer quality control process - Engine sensors		V				
227		Flaws in aircraft system maintenance process definition - Engine sensors		V				
228		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine sensors		٧				
229		Lack of adherence to SOP in terms of safety best practices		V				
230		Go-around attempt after thrust reversers deployment		V				٧
231		Lack of adherence to SOP in terms of aircraft icing (condition) monitoring		V				
232		Lack of adherence to AFM limitations for landing		V				٧
233		Lack of adherence to AFM in terms of emergency procedures - stall recovery		V				
234		Flaws in aircraft system maintenance process definition - ADI system components		V				
235		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ADI system components		٧				
236		Flaws in manufacturer quality control process - ADI system components		V				
237		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).		V				
238		Lack of adherence to the SOP in terms of critical maneuvre execution		V				
239		Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination		V				
240		Incorrect use of automation - Anti-icing system		V				
241		Unintuitive and / or error prone system manual - Anti-icing system		V				



	Safety Performance	Duccinacia		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
242		Lack of adherence to SOP in terms of pre-flight inspections -presence of anti-contamination covers on pitot static tube		V				
243		Lack of adherence to SOP in terms of briefing and checklist before initiating of start of taxiing and take-off		V				
244		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Pitot static system components		٧				
245		Flaws in manufacturer quality control process - Pitot static system components		V				
246		Flaws in aircraft system maintenance process definition - Pitot static systems components		V				
247		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ADI		٧				
248		Flaws in manufacturer quality control process - ADI		V				1
249		Flaws in aircraft system maintenance process definition - ADI		V				
250		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ASI		٧				
251		Flaws in manufacturer quality control process - ASI		V				
252		Flaws in aircraft system maintenance process definition - ASI		V				
253		Lack of adherence to AFM limitations for Take-off		V				
254		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					V	
255		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PFD		٧				
256		Flaws in manufacturer quality control process - PFD		V				
257		Flaws in aircraft system maintenance process definition - PFD		V				
258		Lack of English proficiency					V	
259		Incorrect or confusing / misleading ATC instructions					V	
260		Use of non-standard phraseology by pilot and/or controller					V	
261		Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots					V	
262		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver					V	
263		Flight below maneuvering speeds		V				
264		Lack of adherence of passengers to the recommendation: Fasten seat belt while seated		V				
265		Lack of adherence to SOP in terms of "fasten your seat belt" information activation in passenger cabin during flight in turbulence conditions		٧				
266		Lack of adherence to SOP in terms of load sheet preparation and verification		V				
267		Lack of adherence to SOP in terms of AFM limitations in terms of weigh and balance		V				



	Safety Performance	Para constant		Ор	eration	al issu	<u> </u>	
No.	Indicators	Precursors	1	2	3	4	5	6
268		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components					٧	
269		Flaws in aircraft system maintenance process definition - Hydraulic System					٧	
270		Lack of adherence to emergency procedures - recovery from severe FCS failure		V				
271		Inadequate airline / regulatory provider policy in terms of aware of the risks related to air travel		V				
272		Flaws in aircraft system maintenance process definition - Fire detection system components					V	
273		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components					٧	
274		Flaws in manufacturer quality control process - Fire detection system components					V	
275		Flaws in aircraft system maintenance process definition - Fire warning system					V	
276		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system					٧	
277		Flaws in manufacturer quality control process - Fire warning system					٧	
278		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components					٧	
279		Flaws in aircraft system maintenance process definition - Fire extinguishing system components					٧	
280		Flaws in manufacturer quality control process - Fire extinguishing system components					V	
281		Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications					٧	
282		Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.					V	
283		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence					V	
284		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity					٧	
285		Takeoff without clearance					٧	
286		Landing without clearance					V	
287		Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings					V	
288		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components					٧	
289		Lack of adherence to SOP in terms of requested information support for other aircraft in terms of adverse weather conditions		V				
290		Incorrect weather report obtained by the flight crew		V		$oxed{oxed}^{\neg}$	$oxdot^{\neg}$	
291		Lack of adherence to SOP in terms of providing flight crew with current weather report		V				



	Safety Performance	Draguesara		Operational issue 1				
No.	Indicators	Precursors	1	2	3	4	5	6
292		Flaws in manufacturer quality control process - Power supply system components					٧	
293		Lack of adherence to SOP in terms of application of findings from weather report		V				
294		Lack of adherence to the current technology standards in terms of flight safety and efficiency - fuel tank allocation.		V				
295		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.					V	
296		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.					V	
297		Flaws in manufacturer quality control process - Communication equipment systems and components.					٧	
298		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Rudder components.		٧				
299		Flaws in aircraft system maintenance process definition - Rudder components.		V				
300		Flaws in manufacturer quality control process - Rudder components.		V				
301		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Horizontal stabilizer components.		٧				
302		Flaws in aircraft system maintenance process definition - Horizontal stabilizer components.		V				
303		Flaws in manufacturer quality control process - Horizontal stabilizer components.		V				
304		Lack of adherence to Rules of the Air - adherence to Controller clearance					٧	
305		Navigation deviation					٧	
306		Flaws in Airspace and Air Traffic planning procedures design process					V	
307		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Thrust reverse system in the engine.		٧				
308		Flaws in manufacturer quality control process - Thrust reverse system in the engine.		V				
309		Flaws in aircraft system maintenance process definition - Thrust reverse system in the engine.		V				
310		Flaws in airport capacity management process					٧	
311		Unintuitive and / or error prone system manual - On-board weather radar.		V				
312		Incorrect use of automation - On-board weather radar		V				
313		Lack of adherence to SOP for take-off procedure in terms of time limitation for take-off preparation.					٧	
314		Lack of adherence to SOP in terms of pre-flight inspections - cargo securing quality		٧				
315		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - On-board weather radar		٧				
316		Flaws in manufacturer quality control process - On-board weather radar		V				
317		Flaws in aircraft system maintenance process definition - On-board weather radar		V				



	Safety Performance	Data summaria		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
318		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components					٧	
319		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.					٧	
320		Flaws in manufacturer quality control process - Onboard navigational systems and components.					V	
321		Error in calculation of necessary amount of fuel		V				V
322		Late rejected takeoff decision / initiation					٧	
323		Tailwind component above limit						V
324		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FCS system or components		V				
325		Flaws in manufacturer quality control process - FCS system components		V				
326		Flaws in aircraft system maintenance process definition - FCS systems or components		V				
327		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine fuel distribution system		V				
328		Flaws in manufacturer quality control process - Engine fuel distribution system		V				
329		Flaws in aircraft system maintenance process definition - Engine fuel distribution system		V				
330		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum		V			V	٧
331		Poor application of T/O & RTO procedure, failure recognition and preparedness					٧	
332		Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations					٧	
333		Long / floating flare						V
334		Lack of adherence to the current technology standards in terms of flight safety and efficiency - engines location.		V				
335		Late activation of pedal braking or takeover from autobrake, when so required		V				V
336		Delayed selection of reverse thrust		V				٧
337		Late thrust reduction or power-on touchdown		V				V
338		Failure to arm ground-spoilers		V				V
339		Inappropriate selection of autobrake mode for given runway length and condition		٧				٧
340		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment					٧	
341		Poor application of T/O & RTO procedure, braking initiation sequence					٧	
342		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.					٧	
343		Use of non-standard phraseology by pilot flying (PF) and/or pilot not flying (PNF)		V				



	Safety Performance	December 2		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
344		Lack of adherence to SOP in terms of necessary amount of fuel		V				٧
345		Poor application of T/O & RTO procedure, computation of T/O parameters					٧	
346		Lack of adherence to AFM in terms of emergency procedures - engine failure		٧				
347		Flaws in aircraft system maintenance process definition - Electrical wiring System		V				
348		Taxiing without clearance		V				
349		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Electrical / wiring system components		٧				
350		Flaws in manufacturer quality control process - Electrical / wiring systems components		V				
131	Rate of runway incursion events/flight	Pilot tiredness - Inadequate workload distribution	٧	V			V	
132		Flaws in pilot requirements definition process and/or training methodology	V	V			٧	
133		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	V	V			V	
134		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	V	V			V	
135		Traffic controller tiredness - Inadequate workload distribution	V	V			٧	
136		Flaws in traffic controller requirements definition process and/or training methodology	V	V			V	
137		Lack of or poor communication quality	V				٧	
138		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	٧	٧			٧	
139		Lack of English proficiency	V	V			V	
140		Incorrect or confusing / misleading ATC instructions	V	V			V	
141		Use of non-standard phraseology by pilot and/or controller	V	V			٧	
142		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components		٧			٧	
143		Flaws in aircraft system maintenance process definition - Hydraulic System		V			V	
144		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components		٧			٧	
145		Flaws in aircraft system maintenance process definition - APU systems and / or components		V			V	
146		Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.	V				٧	
147		Takeoff without clearance	V				٧	
148		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components		٧			٧	



	Safety Performance	Dracureare		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
149		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity	V				V	
150		Landing without clearance	٧				V	
151		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.		V			V	
152		Flaws in aircraft system maintenance process definition - Fire detection system components		V			V	
153		Flaws in manufacturer quality control process - Fire detection system components		٧			V	
154		Flaws in aircraft system maintenance process definition - Fire warning system		V			V	
155		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system		V			٧	
156		Flaws in manufacturer quality control process - Fire warning system		V			V	
157		Lack of adherence to SOP for GND movements.	V	V				
158		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence	V				V	
159		Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	٧				٧	
160		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	V				V	
161		Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	V				V	
162		Separation of structural element / component of the aircraft during take-off or landing		V				
163		Lack of adherence to SOP in terms of fuelling procedure		V				
164		Flaws in aircraft system maintenance process definition - Electrical wiring System		V				
165		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fuel system components		V				
166		Inadequate maintenance of fire vulnerable aircraft parts or components		V				
167		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements in terms of fire resistance		V				
168		Lack of adherence to regulations concerning transport of DGR goods		V				
169		Flaws in aircraft system maintenance process definition - Fuel system compoonents		V				
170		Lack of adherence to engine limitations		V				
171		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components		V				
172		Flaws in manufacturer quality control process - Engine systems and / or components		٧				
173		Flaws in aircraft system maintenance process definition - Engine systems and / or components		٧				
174		Flaws in manufacturer quality control process - APU systems and / or components		V				



	Safety Performance	Duranina		Operational issue 2 3 4 5 V V V V V V V V V V V V V V V V V V V V V				
No.	Indicators	Precursors	1	2	3	4	5	6
175		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Electrical / wiring system components		V				
176		Flaws in manufacturer quality control process - Electrical / wiring systems components		V				
177		Inadvertent deviation from cleared taxi route	V					
178		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of fire detection / warning or / and extinguishing system.		V				
179		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components		V			٧	
180		Current airport diagram not reflecting critical changes	V					l
181		Flaws in aircraft system maintenance process definition - Fire extinguishing system components		V			V	
182		Flaws in manufacturer quality control process - Fire extinguishing system components		V			V	
183		Unintuitive and / or error prone system manual - CPCS		V			V	
184		Callsign confusion	V					
185		Lack of adherence to SOP in terms of ATCO and approach or ground controller communication	V					
186		Unintuitive and / or error prone system manual - ground radar.	V					
187		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground Radar	V					
188		Hearback ommitted	V					
189		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ground radar at the airport.	٧					
190		Lack of adherence to SOP in terms of awareness on supporting systems (warning) - ground radar.	V					
191		Lack of adherence to Rules of the Air - adherence to Controller clearance					V	
192		Lack of adherence to AFM in terms of emergency procedures - fire detection and extinguishing procedure		٧				
193		Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications	V				٧	
194		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		V			٧	
195		Inadequate effectivenes of fire extinguishing system		٧				
196		Unintuitive and / or error prone system manual - fire extinguishing system		٧				
197		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					V	
198		Flaws in CRM training procedures					V	
199		Lack of adherence to the main CRM rules	1				V	



	Safety Performance	Duranina	T	Op	eration	al issu	<u> </u>	
No.	Indicators	Precursors	1	2	3	4	5	6
200		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.					٧	
201		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.					٧	
202		Flaws in manufacturer quality control process - Communication equipment systems and components.					V	
203		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring					V	
204		Lack of adherence to SOP for take-off procedure in terms of time limitation for take-off preparation.					V	
205		Inadequate aircraft de-icing / anti-icing					٧	
206		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components					٧	
207		Flaws in manufacturer quality control process - Power supply system components					V	
208		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.					٧	
209		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)					V	
210		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)					٧	1
211		Flaws in aircraft system maintenance process definition - Components of Wing control surface system.					V	
212		Flaws in manufacturer quality control process - Components of Wing control surface system.					V	
213		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine					٧	
214		Navigation deviation					V	
215		Flaws in Airspace and Air Traffic planning procedures design process					٧	
216		Flaws in manufacturer quality control process - Autothrottle system in the engine.					٧	
217		Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.					٧	
218		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components					٧	
219		Flaws in airport capacity management process					V	
220		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)					V	
221		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components					V	
222		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.					V	
223		Flaws in manufacturer quality control process - Onboard navigational systems and components.					V	
224		Lack of adherence to SOP in terms of awareness on supporting systems (warning) - RIMCAS.	V					



	Safety Performance	Discourage.		Ор	eration	<u> </u>		
No.	Indicators	Precursors	1	2	3	4	5	6
225		Late rejected takeoff decision / initiation					٧	
226		Lack of adherence to emergency procedures - RWY collision avoidance	V					
227		Lack of adherence to ICAO Annex 14 and related documents in terms of airside lights distribution	V					
228		Lack of adherence to ICAO Annex 14 and related documents in terms of nonrestricted view on airsite from TWR	V					
229		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of Runway Conflict Warning System.	V					
230		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - RCWS	V					
231		Poor application of T/O & RTO procedure, failure recognition and preparedness					V	
232		Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations					V	
233		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Integrity of primary aircraft structure.		٧				
234		Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.		V				
235		Flaws in manufacturer quality control process - Integrity of primary aircraft structure.		V				
236		Lack of adherence to emergency procedures - flight deck smoke procedure		V				
237		Lack of adherence to the SOP in terms of critical maneuvre execution - flare		V				
238		Extreme operation condition / poor maintenance quality / advanced life lenght		V				
239		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components		٧				
240		Flaws in aircraft system maintenance process definition - Aircraft door system and / or components		V				
241		Flaws in manufacturer quality control process - CPCS system and / or components		V				
242		Flaws in aircraft system maintenance process definition - CPCS system and / or components		V				
243		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - CPCS system and / or components		٧				
244		Incorrect use of automation - CPCS		V				
245		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment					٧	
246		Poor application of T/O & RTO procedure, braking initiation sequence					V	
247		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum					٧	
248		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.					V	
249		Poor application of T/O & RTO procedure, computation of T/O parameters					V	



	Safety Performance	Decompose		Ор	Operational issue 2 3 4 5					
No.	Indicators	Precursors	1	2	3	4	5	6		
250		Inadequate management / separation of takeoffs and landings	V							
131	Rate of ground movement errors/flight	Pilot tiredness - Inadequate workload distribution	٧	٧			V			
132		Flaws in pilot requirements definition process and/or training methodology	V	V			V			
133		Traffic controller tiredness - Inadequate workload distribution	V	V			V			
134		Flaws in traffic controller requirements definition process and/or training methodology	V	V			٧			
135		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	٧	٧			٧			
136		Lack of English proficiency	V	V			V			
137		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	V	V			V			
138		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	V	V			٧			
139		Incorrect or confusing / misleading ATC instructions	V	V			V			
140		Use of non-standard phraseology by pilot and/or controller	V	V			V			
141		Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.	V				V			
142		Lack of adherence to SOP for GND movements.	V	V						
143		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence	V				٧			
144		Lack of or poor communication quality	V				V			
145		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity	V				٧			
146		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	V				V			
147		Inadvertent deviation from cleared taxi route	V							
148		Current airport diagram not reflecting critical changes	V							
149		Takeoff without clearance	V				٧			
150		Landing without clearance	V				٧			
151		Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	V				V			
152		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.		٧			٧			
153		Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	V				٧			
154		Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications	V				V			
155		Separation of structural element / component of the aircraft during take-off or landing		V						



	Safety Performance	Discoursers		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
156		Lack of adherence to SOP in terms of fuelling procedure		V				
157		Flaws in aircraft system maintenance process definition - Electrical wiring System		V				
158		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components		٧				
159		Flaws in aircraft system maintenance process definition - Hydraulic System		V				
160		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fuel system components		٧				
161		Inadequate maintenance of fire vulnerable aircraft parts or components		V				1
162		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements in terms of fire resistance		٧				
163		Lack of adherence to regulations concerning transport of DGR goods		V				
164		Flaws in aircraft system maintenance process definition - Fuel system compoonents		V				
165		Lack of adherence to engine limitations		V				
166		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components		٧				
167		Flaws in manufacturer quality control process - Engine systems and / or components		V				
168		Flaws in aircraft system maintenance process definition - Engine systems and / or components		V				
169		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components		٧				
170		Flaws in manufacturer quality control process - APU systems and / or components		V				
171		Flaws in aircraft system maintenance process definition - APU systems and / or components		V				
172		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Electrical / wiring system components		٧				
173		Flaws in manufacturer quality control process - Electrical / wiring systems components		V				
174		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components		٧				
175		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of fire detection / warning or / and extinguishing system.		٧				
176		Flaws in aircraft system maintenance process definition - Fire detection system components		V				
177		Flaws in manufacturer quality control process - Fire detection system components		V				
178		Flaws in aircraft system maintenance process definition - Fire warning system		٧				
179		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system		٧				



	Safety Performance	Draguese						
No.	Indicators	Precursors	1	2	3	4	5	6
180		Flaws in manufacturer quality control process - Fire warning system		V				
181		Callsign confusion	V					
182		Lack of adherence to SOP in terms of ATCO and approach or ground controller communication	V					
183		Unintuitive and / or error prone system manual - ground radar.	V					
184		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground Radar	V					
185		Hearback ommitted	V					
186		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ground radar at the airport.	V					
187		Lack of adherence to SOP in terms of awareness on supporting systems (warning) - ground radar.	V					
188		Lack of adherence to Rules of the Air - adherence to Controller clearance					٧	
189		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment	V					
190		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components		V				
191		Lack of adherence to AFM in terms of emergency procedures - fire detection and extinguishing procedure		V				<u> </u>
192		Lack of adherence to SOP for GND movements. Poor execution of parking / docking /pushback procedure	V					
193		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		V			٧	
194		Flaws in aircraft system maintenance process definition - Fire extinguishing system components		V				
195		Flaws in manufacturer quality control process - Fire extinguishing system components		V				
196		Unintuitive and / or error prone system manual - CPCS		V			٧	
197		Lack of adherence to emergency procedures - RWY collision avoidance	V					
198		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake)	V					
199		Inadequate effectivenes of fire extinguishing system		V				
200		Unintuitive and / or error prone system manual - fire extinguishing system		V				
201		Flaws in CRM training procedures					٧	
202		Lack of adherence to the main CRM rules					٧	
203		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring					٧	
204		Lack of adherence to SOP for take-off procedure in terms of time limitation for take-off preparation.					٧	
205		Flaws in Airspace and Air Traffic planning procedures design process					٧	



	Safety Performance	Draniusava		Ор	eration	al issu	е	
No.	Indicators	Precursors	1	2	3	4	5	6
206		Flaws in airport capacity management process					٧	
207		Lack of adherence to SOP in terms of awareness on supporting systems (warning) - RIMCAS.	V					
208		Late rejected takeoff decision / initiation					V	
209		Lack of adherence to ICAO Annex 14 and related documents in terms of airside lights distribution	V					
210		Lack of adherence to ICAO Annex 14 and related documents in terms of nonrestricted view on airsite from TWR	V					
211		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of Runway Conflict Warning System.	V					
212		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - RCWS	V					
213		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					V	
214		Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations					٧	
215		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Integrity of primary aircraft structure.		V				
216		Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.		٧				
217		Flaws in manufacturer quality control process - Integrity of primary aircraft structure.		V				
218		Lack of adherence to emergency procedures - flight deck smoke procedure		V				
219		Lack of adherence to the SOP in terms of critical maneuvre execution - flare		V				
220		Extreme operation condition / poor maintenance quality / advanced life lenght		V				
221		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components		V				
222		Flaws in aircraft system maintenance process definition - Aircraft door system and / or components		V				
223		Flaws in manufacturer quality control process - CPCS system and / or components		٧				
224		Flaws in aircraft system maintenance process definition - CPCS system and / or components		V				
225		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - CPCS system and / or components		V				
226		Incorrect use of automation - CPCS		V				
227		Inadequate stall recovery procedure for the aircraft	٧					
228		Inadequate management / separation of takeoffs and landings	V					
229		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment					٧	
230		Poor application of T/O & RTO procedure, braking initiation sequence					٧	
231		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice					V	



	Safety Performance	Precursors	Operational issue							
No.	Indicators	FIELUISUIS	1	2	3	4	5	6		
		presence / or runway surface friction rate below minimum								
232		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.					V			
233		Poor application of T/O & RTO procedure, computation of T/O parameters					V			



	Safety Performance	Draguesare		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
	SYSTEM OF ORGANISATIONS	Deviations: procedural or flight path	GCOL	LOC-I	CFIT	MAC	RE-TO	RE-L
131	System combined runway incursion rate	Pilot tiredness - Inadequate workload distribution	V	V			V	
132		Flaws in pilot requirements definition process and/or training methodology	V	V			V	
133		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	>	V			٧	
134		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	V	V			V	
135		Traffic controller tiredness - Inadequate workload distribution	V	V			V	
136		Flaws in traffic controller requirements definition process and/or training methodology	V	V			V	
137		Lack of or poor communication quality	V				V	
138		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	٧	V			٧	
139		Lack of English proficiency	٧	V			٧	
140		Incorrect or confusing / misleading ATC instructions	V	٧			V	
141		Use of non-standard phraseology by pilot and/or controller	V	V			V	
142		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components		٧			V	
143		Flaws in aircraft system maintenance process definition - Hydraulic System		V			V	
144		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components		V			V	
145		Flaws in aircraft system maintenance process definition - APU systems and / or components		V			V	
146		Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.	V				V	
147		Takeoff without clearance	V				V	
148		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components		V			٧	
149		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity	V				V	
150		Landing without clearance	V				V	
151		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.		٧			V	
152		Flaws in aircraft system maintenance process definition - Fire detection system components		٧			V	



	Safety Performance	Precursors		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
153		Flaws in manufacturer quality control process - Fire detection system components		V			V	
154		Flaws in aircraft system maintenance process definition - Fire warning system		V			٧	
155		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system		V			V	
156		Flaws in manufacturer quality control process - Fire warning system		V			V	
157		Lack of adherence to SOP for GND movements.	V	V				
158		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence	V				٧	
159		Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	V				V	
160		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	V				V	
161		Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	V				V	
162		Separation of structural element / component of the aircraft during take-off or landing		V				
163		Lack of adherence to SOP in terms of fuelling procedure		V				
164		Flaws in aircraft system maintenance process definition - Electrical wiring System		V				
165		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fuel system components		V				
166		Inadequate maintenance of fire vulnerable aircraft parts or components		V				
167		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements in terms of fire resistance		V				
168		Lack of adherence to regulations concerning transport of DGR goods		V				
169		Flaws in aircraft system maintenance process definition - Fuel system compoonents		V				
170		Lack of adherence to engine limitations		V				
171		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components		V				
172		Flaws in manufacturer quality control process - Engine systems and / or components		V				
173		Flaws in aircraft system maintenance process definition - Engine systems and / or components		V				
174		Flaws in manufacturer quality control process - APU systems and / or components		V				
175		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Electrical / wiring system components		V				
176		Flaws in manufacturer quality control process - Electrical / wiring systems components		٧				
177		Inadvertent deviation from cleared taxi route	V					
178		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of fire detection /		V				



	Safety Performance	Discourse		Ор	eration	al issu	е	
No.	Indicators	Precursors	1	2	3	4	5	6
		warning or / and extinguishing system.					1	
179		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components		V			٧	
180		Current airport diagram not reflecting critical changes	V				<u> </u>	
181		Flaws in aircraft system maintenance process definition - Fire extinguishing system components		V			V	
182		Flaws in manufacturer quality control process - Fire extinguishing system components		V			٧	
183		Unintuitive and / or error prone system manual - CPCS		V			V	
184		Callsign confusion	V					
185		Lack of adherence to SOP in terms of ATCO and approach or ground controller communication	V					
186		Unintuitive and / or error prone system manual - ground radar.	V					
187		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground Radar	V					
188		Hearback ommitted	V					
189		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ground radar at the airport.	V					
190		Lack of adherence to SOP in terms of awareness on supporting systems (warning) - ground radar.	V					
191		Lack of adherence to Rules of the Air - adherence to Controller clearance					V	
192		Lack of adherence to AFM in terms of emergency procedures - fire detection and extinguishing procedure		V				
193		Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications	V				٧	
194		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		V			V	
195		Inadequate effectivenes of fire extinguishing system		V				
196		Unintuitive and / or error prone system manual - fire extinguishing system		V				
197		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					V	
198		Flaws in CRM training procedures					٧	
199		Lack of adherence to the main CRM rules					٧	
200		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.					٧	
201		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.					V	
202		Flaws in manufacturer quality control process - Communication equipment systems and components.					V	
203		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring					V	



	Safety Performance	Dragueses		Op	eration	al issu	е	
No.	Indicators	Precursors	1	2	3	4	5	6
204		Lack of adherence to SOP for take-off procedure in terms of time limitation for take-off preparation.					٧	
205		Inadequate aircraft de-icing / anti-icing					٧	
206		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components					V	
207		Flaws in manufacturer quality control process - Power supply system components					V	
208		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.					V	
209		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)					V	
210		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)					٧	
211		Flaws in aircraft system maintenance process definition - Components of Wing control surface system.					٧	
212		Flaws in manufacturer quality control process - Components of Wing control surface system.					٧	
213		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine					V	
214		Navigation deviation					٧	
215		Flaws in Airspace and Air Traffic planning procedures design process					٧	
216		Flaws in manufacturer quality control process - Autothrottle system in the engine.					٧	
217		Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.					٧	
218		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components					V	
219		Flaws in airport capacity management process					٧	
220		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)					٧	
221		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components					٧	
222		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.					V	
223		Flaws in manufacturer quality control process - Onboard navigational systems and components.					٧	
224		Lack of adherence to SOP in terms of awareness on supporting systems (warning) - RIMCAS.	V					
225		Late rejected takeoff decision / initiation					٧	
226		Lack of adherence to emergency procedures - RWY collision avoidance	V					
227		Lack of adherence to ICAO Annex 14 and related documents in terms of airside lights distribution	V					
228		Lack of adherence to ICAO Annex 14 and related documents in terms of nonrestricted view on airsite from TWR	V					



	Safety Performance	Precursors		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
229		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of Runway Conflict Warning System.	٧					
230		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - RCWS	V					
231		Poor application of T/O & RTO procedure, failure recognition and preparedness					V	<u> </u>
232		Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations					V	
233		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Integrity of primary aircraft structure.		V				
234		Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.		V				
235		Flaws in manufacturer quality control process - Integrity of primary aircraft structure.		V				
236		Lack of adherence to emergency procedures - flight deck smoke procedure		V				
237		Lack of adherence to the SOP in terms of critical maneuvre execution - flare		V				
238		Extreme operation condition / poor maintenance quality / advanced life lenght		V				
239		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components		٧				
240		Flaws in aircraft system maintenance process definition - Aircraft door system and / or components		V				
241		Flaws in manufacturer quality control process - CPCS system and / or components		V				
242		Flaws in aircraft system maintenance process definition - CPCS system and / or components		V				
243		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - CPCS system and / or components		V				
244		Incorrect use of automation - CPCS		V				
245		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment					٧	
246		Poor application of T/O & RTO procedure, braking initiation sequence					٧	
247		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum					٧	
248		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.					٧	
249		Poor application of T/O & RTO procedure, computation of T/O parameters					٧	
250		Inadequate management / separation of takeoffs and landings	V					
131	System combined taxiway incursion rate	Pilot tiredness - Inadequate workload distribution	V	V				
132		Flaws in pilot requirements definition process and/or training methodology	V	٧				
133		Traffic controller tiredness - Inadequate workload distribution	V	٧				



	Safety Performance	Precursors		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
134		Flaws in traffic controller requirements definition process and/or training methodology	V	V				
135		Lack of adherence to SOP for GND movements.	V	V				
136		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	V	V				
137		Incorrect or confusing / misleading ATC instructions	V	V				
138		Use of non-standard phraseology by pilot and/or controller	V	V				
139		Lack of English proficiency	V	٧				
140		Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.	V					
141		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence	V					
142		Inadvertent deviation from cleared taxi route	V					
143		Lack of or poor communication quality	V					
144		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity	V					
145		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	V					
146		Current airport diagram not reflecting critical changes	V					
147		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	V	V				
148		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	V	V				
149		Lack of adherence to SOP in terms of ATCO and approach or ground controller communication	V					
150		Unintuitive and / or error prone system manual - ground radar.	V					
151		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground Radar	V					
152		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ground radar at the airport.	V					
153		Lack of adherence to SOP in terms of awareness on supporting systems (warning) - ground radar.	V					
154		Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	V					
155		Callsign confusion	V					
156		Takeoff without clearance	V					
157		Landing without clearance	V					
158		Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	V					
159		Hearback ommitted	V					



	Safety Performance	Precursors		Ор	eration	al issue	2	
No.	Indicators		1	2	3	4	5	6
160		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment	V					
161		Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications	V					
162		Lack of adherence to SOP for GND movements. Poor execution of parking / docking /pushback procedure	V					<u> </u>
163		Lack of adherence to emergency procedures - RWY collision avoidance	V					<u> </u>
164		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake)	V					
165		Lack of adherence to SOP in terms of awareness on supporting systems (warning) - RIMCAS.	V					<u> </u>
166		Lack of adherence to ICAO Annex 14 and related documents in terms of airside lights distribution	V					<u> </u>
167		Lack of adherence to ICAO Annex 14 and related documents in terms of nonrestricted view on airsite from TWR	V					
168		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of Runway Conflict Warning System.	V					
169		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - RCWS	V					
170		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		V				
171		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Integrity of primary aircraft structure.		V				
172		Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.		V				1
173		Flaws in manufacturer quality control process - Integrity of primary aircraft structure.		V				
174		Lack of adherence to emergency procedures - flight deck smoke procedure		V				
175		Lack of adherence to the SOP in terms of critical maneuvre execution - flare		V				
176		Extreme operation condition / poor maintenance quality / advanced life lenght		V				
177		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components		V				
178		Flaws in aircraft system maintenance process definition - Aircraft door system and / or components		V				
179		Flaws in manufacturer quality control process - CPCS system and / or components		V				
180		Flaws in aircraft system maintenance process definition - CPCS system and / or components		V				
181		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - CPCS system and / or components		V				
182		Incorrect use of automation - CPCS		V				
183		Unintuitive and / or error prone system manual - CPCS		V				



	Safety Performance	Duranina		Ор	eration	al issu	е	
No.	Indicators	Precursors	1	2	3	4	5	6
184		Inadequate stall recovery procedure for the aircraft	V					
131	System combined airprox rate	Pilot tiredness - Inadequate workload distribution	V	٧		V	V	V
132		Flaws in pilot requirements definition process and/or training methodology	V	V		V	V	V
133		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	V	V		٧	٧	V
134		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	V	V		٧	٧	V
135		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	V	V		V	V	٧
136		Traffic controller tiredness - Inadequate workload distribution	V	V		V	V	
137		Flaws in traffic controller requirements definition process and/or training methodology	V	V		V	V	
138		Aggressive maneuvering / overcontrolling		V				V
139		Flaws in CRM training procedures		V			٧	V
140		Lack of adherence to the main CRM rules		V			٧	V
141		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		V			٧	٧
142		Lack of or poor communication quality	V			V	V	
143		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path		V				٧
144		Incorrect use of automation - FMS		V			1	V
145		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Integrity of primary aircraft structure.		V				
146		Flaws in manufacturer quality control process - Integrity of primary aircraft structure.		V				
147		Unintuitive and / or error prone system manual - FMS		V			<u> </u>	V
148		Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.		V				
149		Incorrect or confusing / misleading ATC instructions	V	V		V	V	
150		Use of non-standard phraseology by pilot and/or controller	V	V		V	V	
151		Lack of adherence to SOP in terms of approach and landing		V				٧
152		Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing		V				٧
153		Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather.		V				V
154		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.		٧				٧



	Safety Performance	Ducasinosus		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
155		Lack of English proficiency	V	٧		٧	٧	
156		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring		٧			V	
157		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		٧			V	
158		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	V			٧	٧	
159		Inadequate aircraft de-icing / anti-icing		٧			V	
160		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.		٧			V	
161		Lack of adherence to SARPs in terms of avoiding adverse weather conditions during flight		V				
162		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.		٧			V	
163		Flaws in aircraft system maintenance process definition - Components of Wing control surface system.		٧			V	
164		Flaws in manufacturer quality control process - Components of Wing control surface system.		٧			V	
165		Lack of adherence to the SOP in terms of critical indicators cross-checking		٧				
166		Lack of adherence to SOP in terms of AFM limitations		٧				
167		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fuel system components		٧				
168		Flaws in aircraft system maintenance process definition - Fuel system compoonents		٧				
169		Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure		٧				٧
170		Flaws in manufacturer quality control process - Fuel system components.		٧				
171		Lack of adherence to emergency procedures - control recovery		V				V
172		Flaws in manufacturer quality control process - Landing gear components.		٧				
173		Flaws in aircraft system maintenance process definition - Landing gear components.		٧				
174		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine anti-ice systems and / or components		٧				
175		Flaws in manufacturer quality control process - Engine anti-ice system and / or components		V				
176		Flaws in aircraft system maintenance process definition - Engine anti-ice system and / or components		٧				
177		Incorrect use of automation -Engine anti-ice system		٧				
178		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Reduction gear in the engine		٧				
179		Flaws in manufacturer quality control process - Reduction gear in the engine.		٧				
180		Flaws in aircraft system maintenance process definition - Reduction gear in the engine.		٧				



	Safety Performance	Precursors		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
181		Inadequate de-icing method applied		V				
182		Hearback ommitted	V			V		
183		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Compressor in the engine		٧				
184		Flaws in manufacturer quality control process - Compressor in the engine.		٧				
185		Flaws in aircraft system maintenance process definition - Compressor in the engine.		V				
186		Flaws in manufacturer quality control process - Engine accessory drive components.		V				
187		Flaws in aircraft system maintenance process definition - Engine accessory drive components.		V				
188		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine accessory drive components.		٧				
189		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ECAM (or similar) system components.		V				
190		Lack of adherence to emergency procedures - Fuel starvation		V				1
191		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components		٧				
192		Flaws in aircraft system maintenance process definition - Oil distribution system		V				
193		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Oil distribution system		٧				
194		Flaws in manufacturer quality control process - Oil distribution system		V				
195		Flaws in aircraft system maintenance process definition - ECAM (or similar) system components.		٧				
196		Unintuitive and / or error prone system manual - Engine anti-icing system		V				
197		Lack of adherence to SOP in terms of de-icing / anti-icing procedures.		V				
198		Flaws in manufacturer quality control process - ECAM (or similar) system components.		V				
199		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ECAM.		V				
200		Lack of adherence to Rules of the Air - adherence to Controller clearance				V	V	
201		Flaws in Airspace and Air Traffic planning procedures design process				V	V	
202		Flaws in aircraft system maintenance process definition - Engine combustor		٧				
203		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine combustor		٧				
204		Flaws in manufacturer quality control process - Engine combustor		٧				
205		Flaws in aircraft system maintenance process definition - Engine turbine components		V				



	Safety Performance	Decompose		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
206		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine turbine components		V				
207		Flaws in manufacturer quality control process - Engine turbine components		V				1
208		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)		٧		٧	V	
209		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)		٧		V	٧	
210		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)		V		٧	٧	
211		Flaws in manufacturer quality control process - Engine systems and / or components		V				
212		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.				٧	٧	
213		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.				٧	V	
214		Flaws in manufacturer quality control process - Communication equipment systems and components.				V	٧	
215		Tactical or / and Planning Controller tiredness - Inadequate workload distribution				V		
216		Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology				٧		
217		Navigation deviation				V	٧	
218		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components				V	V	
219		Flaws in manufacturer quality control process - Onboard navigational systems and components.				٧	٧	
220		Flaws in manufacturer quality control process - Fire extinguishing system components				V	٧	
221		Unintuitive and / or error prone system manual - CPCS		٧			٧	٧
222		Inadequate coordination between ATM centers and/or ATC sectors				V		
223		Landing without clearance	V				٧	
224		Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	V				٧	
225		Unintuitive and / or error prone system manual - communication equipment.				٧		
226		Altitude deviation				V		
227		Level bust (pilot lapse or late re-clearance by ATC)				V		
228		Flaws in conflict and separation minima infringement detection / elimination procedures				V		
229		Lack of adherence of airlines to time contraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data.				٧		
230		Incorrect use of communication equipment				V		
231		Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	V				٧	



	Safety Performance	Precursors		V V V V V V				
No.	Indicators	Precursors	1	2	3	4	5	6
232		Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.	V				V	
233		Takeoff without clearance	V				V	
234		Failure to comply with an altitude or speed restriction / constraint				V		
235		Deviation from flight trajectory commanded by controller				٧		
236		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence	V				V	
237		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity	V				V	
238		Altimeter setting error				V		
239		Lack of adherence to SOP for take-off procedure in terms of altimeter callibration.				٧		
240		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MTCD System				٧		
241		Lack of adherence of airlines to declared Flight Plan.				V		
242		Failure to identify the pre-tactical conflict before it reach the tactical controller				V		
243		Lack of adherence to SOP for Airborne operation in terms of minimum seprataion				٧		
244		Military activity in controlled airport or located within controlled area				٧		
245		General aviation activity in controlled airport or located within controlled area				٧		
246		Intensified traffic related to general aviation activity e. g. over GA airport / airfield				V		
247		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components		V			V	
248		Flaws in aircraft system maintenance process definition - APU systems and / or components		V			٧	
249		Lack of adherence to SOP for GND movements.	V	V				
250		Lack of adherence to SOP in terms of ATCO and approach or ground controller communication	V					
251		Inadvertent deviation from cleared taxi route	V					
252		Callsign confusion	V					
253		Current airport diagram not reflecting critical changes	V					
254		Unintuitive and / or error prone system manual - ground radar.	V					
255		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground Radar	V					
256		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ground radar at the airport.	V					
257		Lack of adherence to SOP in terms of awareness on supporting systems (warning) - ground radar.	V					<u> </u>



	Safety Performance	Precursors		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
258		Lack of adherence to AFM in terms of emergency procedures - engine restart procedure		V				
259		Flaws in manufacturer quality control process - APU systems and / or components		V				
260		Lack of adherence to SOP in terms of awareness on supporting systems warning		V				
261		Unintuitive and / or error prone system manual - ECAM		V				
262		Descent above desired descent profile		V				V
263		High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,)		V				V
264		Late deceleration and configuration set-up for approach and landing		V				V
265		DME / ILS DME confusion in assessing the final descent point / FAF		V				V
266		Unstabilized final approach (high, fast, steep,)		V				V
267		Flaws in manufacturer quality control process - Engine sensors		V				
268		Flaws in aircraft system maintenance process definition - Engine sensors		V				
269		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine sensors		V				
270		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of STCA System.				٧		
271		Lack of adherence to regulations concerning independent ATCO monitoring				٧		
272		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - STCA System				V		
273		Go-around attempt after thrust reversers deployment		V				V
274		Lack of adherence to AFM limitations for landing		V				V
275		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine		V			V	
276		Flaws in manufacturer quality control process - Autothrottle system in the engine.		V			V	
277		Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.		V			٧	
278		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine fuel distribution system		V				
279		Flaws in manufacturer quality control process - Engine fuel distribution system		V				
280		Flaws in aircraft system maintenance process definition - Engine fuel distribution system		V				
281		Lack of adherence to AFM limitations for Take-off		٧				
282		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					V	
283		Lack of adherence to SOP in terms of requested information support for other aircraft in terms of adverse weather		V				



	Safety Performance	Precursors		Op	eration	al issu	e	-
No.	Indicators	Precursors	1	2	3	4	5	6
		conditions						
284		Lack of adherence to SOP in terms of application of findings from weather report		V				
285		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.				٧	٧	
286		Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications					٧	
287		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components					٧	
288		Incorrect weather report obtained by the flight crew		V				
289		Lack of adherence to SOP in terms of providing flight crew with current weather report		٧				
290		Flaws in manufacturer quality control process - Power supply system components					٧	
291		Flaws in airport capacity management process					V	
292		Unintuitive and / or error prone system manual - On-board weather radar.		٧				
293		Incorrect use of automation - On-board weather radar		V				
294		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - On-board weather radar		٧				
295		Flaws in manufacturer quality control process - On-board weather radar		٧				
296		Flaws in aircraft system maintenance process definition - On-board weather radar		V				
297		Lack of adherence of passengers to the recommendation: Fasten seat belt while seated		V				
298		Lack of adherence to SOP in terms of "fasten your seat belt" information activation in passenger cabin during flight in turbulence conditions		٧				
299		Lack of adherence to the current technology standards in terms of flight safety and efficiency - fuel tank allocation.		V				
300		Lack of adherence to SOP in terms of AFM limitations in terms of weigh and balance		V				
301		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components					٧	
302		Flaws in aircraft system maintenance process definition - Hydraulic System					٧	
303		Lack of adherence to SOP for take-off procedure in terms of time limitation for take-off preparation.					V	
304		Inadequate airline / regulatory provider policy in terms of aware of the risks related to air travel		٧				
305		Lack of adherence to SOP in terms of pre-flight inspections - cargo securing quality		٧				
306		Flaws in aircraft system maintenance process definition - Fire detection system components					٧	
307		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components					V	



	Safety Performance	Precursors		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
308		Flaws in manufacturer quality control process - Fire detection system components					V	
309		Flaws in aircraft system maintenance process definition - Fire warning system					V	
310		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system					V	
311		Flaws in manufacturer quality control process - Fire warning system					V	<u>L</u>
312		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components					V	
313		Flaws in aircraft system maintenance process definition - Fire extinguishing system components					V	<u>L</u>
314		Lack of adherence to SOP in terms of awareness on supporting systems (warning) - RIMCAS.	V					
315		Error in calculation of necessary amount of fuel		V				٧
316		Lack of adherence to SOP in terms of load sheet preparation and verification		V				
317		Late rejected takeoff decision / initiation					٧	
318		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components		V				
319		Flaws in aircraft system maintenance process definition - Aircraft door system and / or components		V				
320		Flaws in manufacturer quality control process - CPCS system and / or components		V				
321		Flaws in aircraft system maintenance process definition - CPCS system and / or components		V				
322		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - CPCS system and / or components		V				
323		Lack of adherence to emergency procedures - RWY collision avoidance	V					
324		Lack of adherence to ICAO Annex 14 and related documents in terms of airside lights distribution	V					
325		Lack of adherence to ICAO Annex 14 and related documents in terms of nonrestricted view on airsite from TWR	V					
326		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of Runway Conflict Warning System.	V					
327		Flight below maneuvering speeds		V				
328		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum		V			٧	٧
329		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - RCWS	V					
330		Poor application of T/O & RTO procedure, failure recognition and preparedness					٧	
331		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Rudder components.		V				



	Safety Performance	D		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
332		Flaws in aircraft system maintenance process definition - Rudder components.		٧				
333		Flaws in manufacturer quality control process - Rudder components.		V				
334		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Horizontal stabilizer components.		V				
335		Flaws in aircraft system maintenance process definition - Horizontal stabilizer components.		٧				
336		Flaws in manufacturer quality control process - Horizontal stabilizer components.		V				
337		Lack of adherence to AFM in terms of emergency procedures - stall recovery		V				
338		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Thrust reverse system in the engine.		V				
339		Flaws in manufacturer quality control process - Thrust reverse system in the engine.		٧				
340		Flaws in aircraft system maintenance process definition - Thrust reverse system in the engine.		٧				
341		Lack of adherence to emergency procedures - flight deck smoke procedure		>				
342		Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations					V	
343		Lack of adherence to the SOP in terms of critical maneuvre execution - flare		>				
344		Extreme operation condition / poor maintenance quality / advanced life lenght		>				
345		Incorrect use of automation - CPCS		>				
346		Lack of adherence to the current technology standards in terms of flight safety and efficiency - engines location.		٧				
347		Late activation of pedal braking or takeover from autobrake, when so required		V				٧
348		Delayed selection of reverse thrust		V				٧
349		Late thrust reduction or power-on touchdown		٧				٧
350		Failure to arm ground-spoilers		٧				٧
351		Inappropriate selection of autobrake mode for given runway length and condition		V				٧
352		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment					٧	
353		Poor application of T/O & RTO procedure, braking initiation sequence					٧	
354		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.					V	
355		Lack of adherence to SOP in terms of necessary amount of fuel		٧				٧
356		Poor application of T/O & RTO procedure, computation of T/O parameters					V	
357		Lack of adherence to emergency procedures - recovery from severe FCS failure		٧				
358		Lack of adherence to AFM in terms of emergency procedures - engine failure		V				



	Safety Performance	Ducasiyaaya		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
359		Flaws in aircraft system maintenance process definition - Electrical wiring System		V				
360		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ACAS system components				٧		
361		Inappropriate visual avoidance maneuver				V		
362		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ADI system components				V		
363		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ACAS installed on aircraft.				V		
364		Late or inadequate response to ACAS warning				V		
365		Flaws in aircraft system maintenance process definition - Engine systems and / or components		V				
366		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Electrical / wiring system components		V				
367		Flaws in manufacturer quality control process - Electrical / wiring systems components		V				
131	Operator combined erroneous weather prediction rate	Pilot tiredness - Inadequate workload distribution	V	V	٧	\	V	V
132		Flaws in pilot requirements definition process and/or training methodology	V	V	V	V	V	V
133		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	٧	V	٧	٧	٧	V
134		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	٧	V	٧		>	V
135		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	V	V	V		٧	V
136		Traffic controller tiredness - Inadequate workload distribution	V	V	V	V	٧	٧
137		Flaws in traffic controller requirements definition process and/or training methodology	V	V	V	V	٧	٧
138		Lack of adherence to SOP in terms of approach and landing		V	V			V
139		Flaws in CRM training procedures		V	V		٧	٧
140		Lack of adherence to the main CRM rules		V	V		٧	٧
141		Lack of adherence to the SOP in terms of critical indicators cross-checking		V	V			
142		Incorrect use of automation - FMS		V	V			٧
143		Unintuitive and / or error prone system manual - FMS		٧	V			٧
144		Aggressive maneuvering / overcontrolling		٧				٧
145		Lack of English proficiency	V	٧	V	V	V	



	Safety Performance	Duranteen		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
146		Use of non-standard phraseology by pilot and/or controller	V	٧	٧	٧	V	
147		Lack of or poor communication quality	V		V	V	V	
148		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	V		V	V	V	
149		Inadequate aircraft de-icing / anti-icing		V			V	
150		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).		V	٧			٧
151		Lack of adherence to SOP in terms of de-icing / anti-icing procedures.	ļ	٧			V	
152		Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing		V			1	V
153		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.		V	٧			٧
154		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		V				V
155		Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather.		V				V
156		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path		٧				V
157		Incorrect or confusing / misleading ATC instructions	V	>		V	V	
158		Current airport diagram not reflecting critical changes	V		٧		1	
159		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Integrity of primary aircraft structure.		V				
160		Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.		٧			<u> </u>	
161		Flaws in manufacturer quality control process - Integrity of primary aircraft structure.	ļ	٧			<u> </u>	
162		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	ļ	٧			V	
163		Lack of adherence to emergency procedures - control recovery		V				V
164		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		V			V	
165		Lack of adherence to SARPs in terms of avoiding adverse weather conditions during flight		٧				
166		Altimeter setting error			V	V	1	
167		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)			٧	٧		
168		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)			٧	٧		
169		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)			٧	٧		
170		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components			V	V		



	Safety Performance	Ducasiyaaya		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
171		Flaws in manufacturer quality control process - Onboard navigational systems and components.			٧	V		
172		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.		V			٧	
173		Lack of adherence to SOP in terms of AFM limitations		V				
174		Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure		V				V
175		Flaws in manufacturer quality control process - Landing gear components.		V				
176		Flaws in aircraft system maintenance process definition - Landing gear components.		V				
177		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fuel system components		V				
178		Flaws in aircraft system maintenance process definition - Fuel system compoonents		V				<u> </u>
179		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine anti-ice systems and / or components		V				
180		Flaws in manufacturer quality control process - Engine anti-ice system and / or components		V				
181		Flaws in aircraft system maintenance process definition - Engine anti-ice system and / or components		V				<u> </u>
182		Incorrect use of automation -Engine anti-ice system		V				<u> </u>
183		Flaws in manufacturer quality control process - Fuel system components.		V				<u> </u>
184		Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.	V				٧	<u> </u>
185		Inadequate de-icing method applied		V				<u> </u>
186		Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination		V	٧			
187		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components		V				
188		Unintuitive and / or error prone system manual - Engine anti-icing system		V				<u> </u>
189		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Reduction gear in the engine		V				
190		Flaws in manufacturer quality control process - Reduction gear in the engine.		V				
191		Flaws in aircraft system maintenance process definition - Reduction gear in the engine.		V				<u> </u>
192		Lack of adherence to emergency procedures - Fuel starvation		V				<u> </u>
193		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Compressor in the engine		V				
194		Flaws in manufacturer quality control process - Compressor in the engine.		٧				
195		Flaws in aircraft system maintenance process definition - Compressor in the engine.		٧				L



	Safety Performance	Ducasinosus		Operational issue				
No.	Indicators	Precursors	1	2	3	4	5	6
196		Flaws in manufacturer quality control process - Engine accessory drive components.		V				
197		Flaws in aircraft system maintenance process definition - Engine accessory drive components.		V				
198		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine accessory drive components.		٧				
199		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ECAM (or similar) system components.		٧				
200		Flaws in aircraft system maintenance process definition - ECAM (or similar) system components.		V				
201		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ECAM.		V				
202		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.		٧				
203		Flaws in aircraft system maintenance process definition - Components of Wing control surface system.		V				
204		Flaws in manufacturer quality control process - Components of Wing control surface system.		V				
205		Flaws in manufacturer quality control process - ECAM (or similar) system components.		V				
206		Flaws in aircraft system maintenance process definition - Oil distribution system		V				
207		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Oil distribution system		٧				
208		Flaws in manufacturer quality control process - Oil distribution system		V				
209		Lack of adherence to SOP for GND movements.	V	V				
210		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence	V				٧	
211		Hearback ommitted	V			V		
212		Flaws in manufacturer quality control process - Engine systems and / or components		V				
213		Flaws in aircraft system maintenance process definition - Engine combustor		V				
214		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine combustor		٧				
215		Flaws in manufacturer quality control process - Engine combustor		V				
216		Flaws in aircraft system maintenance process definition - Engine turbine components		V				
217		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine turbine components		٧				
218		Flaws in manufacturer quality control process - Engine turbine components		٧				
219		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity	V				V	
220		High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,)		٧				٧



	Safety Performance	Durantina		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
		or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,)						
221		Late deceleration and configuration set-up for approach and landing		V				٧
222		Inadvertent deviation from cleared taxi route	V					
223		Failure to check navigation accuracy before approach			V			
224		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. Navigational aid failure.			٧			
225		Lack of adherence to SOP for AIR operations in terms of controller error in approach clearence instruction			٧			
226		Not recognized ground Navaids System failure not reflected in NOTAM messages			V			
227		Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS)			V			
228		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS)			V			
229		Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS)			V			
230		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.			V			
231		Lack of adherence to Rules of the Air - adherence to Controller clearance				V	V	
232		Flaws in Airspace and Air Traffic planning procedures design process				V	٧	
233		Unstabilized final approach (high, fast, steep,)		V				٧
234		Unintuitive and / or error prone system manual - CPCS		V			٧	٧
235		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum		٧			V	٧
236		Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	V				٧	
237		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Anti-icing system components		V				
238		Failure to remember / assess crosswind component limit for prevailing runway condition					٧	٧
239		Takeoff without clearance	V				٧	
240		Landing without clearance	V				٧	
241		Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	V				٧	
242		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.				V		
243		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.				V		
244		Flaws in manufacturer quality control process - Communication equipment systems and components.				V		
245		Lack of adherence to SOP for take-off procedure in terms of altimeter callibration.				V		



	Safety Performance	Precursors		Operational issue 1				
No.	Indicators	Precursors	1	2	3	4	5	6
246		Tactical or / and Planning Controller tiredness - Inadequate workload distribution				V		
247		Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology				V		
248		Unintuitive and / or error prone system manual - communication equipment.				V		
249		Altitude deviation				V		
250		Level bust (pilot lapse or late re-clearance by ATC)				V		
251		Failure to comply with an altitude or speed restriction / constraint				V		
252		Navigation deviation				V		
253		Inadequate coordination between ATM centers and/or ATC sectors				V		
254		Flaws in conflict and separation minima infringement detection / elimination procedures				V		
255		Lack of adherence of airlines to time contraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data.				V		
256		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MTCD System				V		<u> </u>
257		Lack of adherence of airlines to declared Flight Plan.				V		
258		Failure to identify the pre-tactical conflict before it reach the tactical controller				V		
259		Lack of adherence to SOP for Airborne operation in terms of minimum seprataion				V		i.
260		Incorrect use of communication equipment				V		
261		Military activity in controlled airport or located within controlled area				V		
262		General aviation activity in controlled airport or located within controlled area				V		
263		Intensified traffic related to general aviation activity e.g. over GA airport / airfield				V		
264		Deviation from flight trajectory commanded by controller				V		
265		Flaws in manufacturer quality control process - Anti-icing system components		V				
266		Flaws in aircraft system maintenance process definition - Anti-icing systems components		V				
267		DME / ILS DME confusion in assessing the final descent point / FAF		٧				٧
268		Flaws in manufacturer quality control process - Fire extinguishing system components				V		
269		Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications	V				٧	
270		Excessive pitch attitude		V				
271		Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling		V			V	
272		Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared		٧				V



	Safety Performance	D		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
273		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System.		٧				٧
274		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system		٧				٧
275		Difference indications of independent aircraft speed / altitude or attitude indicators		V				
276		Flaws in manufacturer quality control process - PWS system components		V				V
277		Imbalanced and inaproppriate relation between cpt and his subordinates			V		<u> </u>	
278		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.		V				٧
279		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - LLWAS system		V				V
280		Excessive bank angle		V			<u> </u>	
281		Lack of adherence to SOP in terms of aircraft icing (condition) monitoring		V			٧	
282		Unintuitive and / or error prone system manual - ground radar.	V					
283		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground Radar	V					
284		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ground radar at the airport.	V					
285		Lack of adherence to SOP in terms of awareness on supporting systems (warning) - ground radar.	V					
286		Lack of adherence to AFM limitations for Take-off					٧	
287		Late rejected takeoff decision / initiation					V	
288		Descent above desired descent profile		V				٧
289		Callsign confusion	V					
290		Lack of adherence to SOP in terms of ATCO and approach or ground controller communication	V					
291		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					V	
292		Lack of adherence to AFM limitations for landing		V				٧
293		Lack of adherence to AFM in terms of emergency procedures - engine restart procedure		٧				
294		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components		V				
295		Flaws in manufacturer quality control process - APU systems and / or components		V				
296		Flaws in aircraft system maintenance process definition - APU systems and / or components		٧				
297		Lack of adherence to SOP in terms of awareness on supporting systems warning		٧				
298		Unintuitive and / or error prone system manual - ECAM		٧				



	Safety Performance	Precursors		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
299		Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations					٧	
300		Tailwind component above limit						V
301		Flaws in manufacturer quality control process - Engine sensors		V				
302		Flaws in aircraft system maintenance process definition - Engine sensors		V				
303		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine sensors		V				
304		Lack of adherence to emergency procedures - WEM		V			<u> </u>	V
305		Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.		V			V	
306		Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT)		V			V	
307		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - antiice fluid HOT		V			V	
308		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of STCA System.				V	<u> </u>	
309		Lack of adherence to regulations concerning independent ATCO monitoring				V		
310		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - STCA System				٧		
311		Go-around attempt after thrust reversers deployment		V				V
312		Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing		V			V	
313		Lack of adherence to AFM in terms of emergency procedures - stall recovery		V			V	
314		Lack of adherence to emergency procedures - RWY collision avoidance	V					
315		Lack of adherence to SOP for GND movements. Poor execution of parking / docking /pushback procedure	V					
316		Applied de-icing / anti-icing method is not sufficient for predicted conditions		V			V	
317		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment	V					
318		Incorrect use of automation - Anti-icing system		V				
319		Poor application of T/O & RTO procedure, aircraft handling					V	
320		Unintuitive and / or error prone system manual - Anti-icing system		V				
321		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PFD	_	V				
322		Flaws in manufacturer quality control process - PFD		V				
323		Flaws in aircraft system maintenance process definition - PFD		٧				
324		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance	V					



	Safety Performance	Drocursors		Operational issue 1 2 3 4 5				
No.	Indicators	Precursors	1	2	3	4	5	6
		with requirements - marshalling/rolling/taxiing control related system and components (incl. brake)						
325		Lack of adherence to the SOP in terms of critical maneuvre execution		V				
326		Lack of adherence to SOP in terms of requested information support for other aircraft in terms of adverse weather conditions		V				
327		Lack of adherence to SOP in terms of application of findings from weather report		V				
328		Lack of adherence to SOP in terms of safety best practices		V				
329		Flaws in aircraft system maintenance process definition - ADI system components		V				
330		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ADI system components		V				
331		Flaws in manufacturer quality control process - ADI system components		V				
332		Lack of adherence to SOP in terms of pre-flight inspections -presence of anti-contamination covers on pitot static tube		V				
333		Lack of adherence to SOP in terms of briefing and checklist before initiating of start of taxiing and take-off		V				
334		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Pitot static system components		V				
335		Flaws in manufacturer quality control process - Pitot static system components		V				
336		Flaws in aircraft system maintenance process definition - Pitot static systems components		V				
337		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ADI		V				
338		Flaws in manufacturer quality control process - ADI		V				
339		Flaws in aircraft system maintenance process definition - ADI		V				
340		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ASI		V				
341		Flaws in manufacturer quality control process - ASI		V				
342		Flaws in aircraft system maintenance process definition - ASI		V				
343		Late activation of pedal braking or takeover from autobrake, when so required		V				٧
344		Delayed selection of reverse thrust		V				٧
345		Inappropriate selection of autobrake mode for given runway length and condition		V				٧
346		Incorrect weather report obtained by the flight crew		V				
347		Lack of adherence to SOP in terms of providing flight crew with current weather report		V				
348		Lack of adherence of passengers to the recommendation: Fasten seat belt while seated		٧				
349		Lack of adherence to SOP in terms of "fasten your seat belt" information activation in passenger cabin during flight in		V				



	Safety Performance	Ducasinopue		Op	eration	al issuc	e	
No.	Indicators	Precursors	1	2	3	4	5	6
		turbulence conditions						
350		Unintuitive and / or error prone system manual - On-board weather radar.		V				
351		Incorrect use of automation - On-board weather radar		V				
352		Inadequate airline / regulatory provider policy in terms of aware of the risks related to air travel		V				
353		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - On-board weather radar		V				
354		Flaws in manufacturer quality control process - On-board weather radar		V				
355		Flaws in aircraft system maintenance process definition - On-board weather radar		V				
356		Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.					V	
357		Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.					V	
358		Unintuitive and / or error prone system manual - FMC					V	
359		Flaws in aircraft system maintenance process definition - Electrical wiring System		V			V	
360		Incorrect stab-trim setting					V	
361		Undetected incorrect takeoff configuration					V	
362		Flaws in airport capacity management process					V	
363		Lack of adherence to SOP for take-off procedure in terms of time limitation for take-off preparation.					V	
364		Inadequate crosswind landing / decrab technique						٧
365		Touchdown off centerline						V
366		Use of nose wheel steering tiller during rollout						>
367		Flaws in aircraft system maintenance process definition - stickshaker		V			٧	
368		Lack of adherence to SOP in terms of awareness on supporting systems (warning) - RIMCAS.	V					
369		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - stickshaker system components		V			٧	
370		Incorrect use of automation - TOCW System					V	
371		Lack of adherence to SOP in terms of awareness on supporting systems warning - stickshaker		V			٧	
372		Flaws in aircraft system maintenance process definition - TOCW System					٧	
373		Unintuitive and / or error prone system manual - TOCW					٧	
374		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System					V	



	Safety Performance	Ducasiyaaya		Ор	V			
No.	Indicators	Precursors	1	2	3	4	5	6
375		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components					V	
376		Flaws in manufacturer quality control process - Power supply system components					V	<u> </u>
377		Error in calculation of necessary amount of fuel		V				V
378		Lack of adherence to SOP in terms of pre-flight inspections - ice presence on aircraft		V				<u> </u>
379		Lack of adherence to emergency procedures - recovery from severe FCS failure		V				
380		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FCS system or components		V				
381		Flaws in manufacturer quality control process - FCS system components		V				<u> </u>
382		Flaws in aircraft system maintenance process definition - FCS systems or components		V				<u> </u>
383		Long / floating flare						V
384		Inappropriate use of differential reverse thrust						V
385		Inadequate use of differential braking						V
386		Lack of adherence to ICAO Annex 14 and related documents in terms of airside lights distribution	V					<u> </u>
387		Lack of adherence to ICAO Annex 14 and related documents in terms of nonrestricted view on airsite from TWR	V					
388		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of Runway Conflict Warning System.	V					
389		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - RCWS	V					
390		Lack of adherence to TO procedure in terms of antiice protection		V				
391		Flaws in manufacturer quality control process - anti-ice fluid specifications (HOT)		V				<u> </u>
392		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment					V	
393		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.					V	
394		Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain)			V			<u> </u>
395		Premature descent to DA(H) before G/S intercept or premature descent to MDA(H) before final-descent-point / FAF			V			<u> </u>
396		Premature descent below MDA(H) before reaching the visual-descent-point (VDP)			V			<u> </u>
397		Flight below desired flight path during initial and/or final approach			V			
398		Continued approach, when below DA(H) or MDA(H), after loss of visual references			V			
399		Late or inadequate response to MSAW warning			V			
400		Failure to go-around, when so required			V			



	Safety Performance	Пиолически		Op	Operational issue			
No.	Indicators	Precursors	1	2	3	4	5	6
401		Failure to follow published missed-approach procedure			٧			
402		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of MSAW system.			٧			
403		Lack of adherence to emergency procedures - flight deck smoke procedure		V				
404		Lack of adherence to AFM in terms of emergency procedures - windshear recovery		٧				
405		Lack of adherence to the SOP in terms of critical maneuvre execution - flare		V				
406		Extreme operation condition / poor maintenance quality / advanced life lenght		V				
407		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components		V				
408		Flaws in aircraft system maintenance process definition - Aircraft door system and / or components		V				
409		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MSAW System			٧			
410		Lack of adherence to the current technology standards in terms of flight safety and efficiency - engines location.		٧				
411		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. MSAW warning.			V			
412		Flaws in manufacturer quality control process - CPCS system and / or components		V				
413		Flaws in aircraft system maintenance process definition - CPCS system and / or components		٧				
414		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - CPCS system and / or components		٧				
415		Incorrect use of automation - CPCS		V				
416		Late thrust reduction or power-on touchdown		V				٧
417		Failure to arm ground-spoilers		V				٧
418		Poor application of T/O & RTO procedure, braking initiation sequence					٧	
419		Use of non-standard phraseology by pilot flying (PF) and/or pilot not flying (PNF)		٧				
420		Lack of adherence to SOP in terms of necessary amount of fuel		V				٧
421		Poor application of T/O & RTO procedure, computation of T/O parameters					٧	
422		Lack of adherence to AFM in terms of emergency procedures - engine failure		V				
423		Inadequate stall recovery procedure for the aircraft					٧	
424		Inadequate management / separation of takeoffs and landings	V					
425		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment		V				
426		Flaws in manufacturer quality control process - Stickshaker system components		V				
427		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance			_	V		



	Safety Performance	Dracureare	Operational issue					
No.	Indicators	Precursors	1	2	3	4	5	6
		with requirements - ACAS system components						
428		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS			V			
429		Inappropriate visual avoidance maneuver				V		
430		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ACAS installed on aircraft.				V		
431		Late or inadequate response to ACAS warning				V		
432		Flaws in aircraft system maintenance process definition - Engine systems and / or components		V				
433		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Electrical / wiring system components		V				
434		Flaws in manufacturer quality control process - Electrical / wiring systems components		V				
435		Flaws in aircraft system maintenance process definition - GPWS system components			V			
436		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - GPWS system components			V			
437		Flaws in manufacturer quality control process - GPWS system components			V			
131	System combined bird strike rate	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology		٧			٧	V
132		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution		V			V	V
133		Pilot tiredness - Inadequate workload distribution		V			٧	V
134		Flaws in pilot requirements definition process and/or training methodology		٧			٧	V
135		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring		V			٧	٧
136		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		٧			٧	٧
137		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties		V			٧	
138		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.		V			V	V
139		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		V			٧	V
140		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Integrity of primary aircraft structure.		V				
141		Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.		V				
142		Flaws in manufacturer quality control process - Integrity of primary aircraft structure.		V				
143		Lack of adherence to the SOP in terms of critical indicators cross-checking		V				
144		Inadequate aircraft de-icing / anti-icing		V				



	Safety Performance	Drocursors		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
145		Aggressive maneuvering / overcontrolling		٧				
146		Lack of adherence to SOP in terms of AFM limitations		V				
147		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fuel system components		V				
148		Flaws in aircraft system maintenance process definition - Fuel system compoonents		٧				
149		Lack of adherence to SARPs in terms of avoiding adverse weather conditions during flight		V				
150		Flaws in manufacturer quality control process - Fuel system components.		V				
151		Incorrect use of automation -Engine anti-ice system		V				
152		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Compressor in the engine		٧				
153		Flaws in manufacturer quality control process - Compressor in the engine.		V				
154		Flaws in aircraft system maintenance process definition - Compressor in the engine.		V				
155		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine anti-ice systems and / or components		V				
156		Flaws in manufacturer quality control process - Engine anti-ice system and / or components		V				
157		Flaws in aircraft system maintenance process definition - Engine anti-ice system and / or components		V				
158		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Reduction gear in the engine		٧				
159		Flaws in manufacturer quality control process - Reduction gear in the engine.		V				
160		Flaws in aircraft system maintenance process definition - Reduction gear in the engine.		V				
161		Lack of adherence to emergency procedures - Fuel starvation		V				
162		Inadequate de-icing method applied		٧				
163		Flaws in manufacturer quality control process - Engine accessory drive components.		V				
164		Flaws in aircraft system maintenance process definition - Engine accessory drive components.		V				
165		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine accessory drive components.		٧				
166		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ECAM (or similar) system components.		٧				
167		Flaws in aircraft system maintenance process definition - ECAM (or similar) system components.		٧				
168		Unintuitive and / or error prone system manual - Engine anti-icing system		٧				
169		Lack of adherence to SOP in terms of de-icing / anti-icing procedures.		٧				



	Safety Performance	Precursors		Op	eration	al issue	e	
No.	Indicators	Precursors	1	2	3	4	5	6
170		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ECAM.		V				
171		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.		V				
172		Flaws in aircraft system maintenance process definition - Components of Wing control surface system.		V				
173		Flaws in manufacturer quality control process - Components of Wing control surface system.		V				
174		Flaws in manufacturer quality control process - ECAM (or similar) system components.		V				
175		Flaws in manufacturer quality control process - Landing gear components.		V				
176		Flaws in aircraft system maintenance process definition - Landing gear components.		V				
177		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components		٧				
178		Flaws in aircraft system maintenance process definition - Oil distribution system		V				
179		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Oil distribution system		V				
180		Flaws in manufacturer quality control process - Oil distribution system		V				
181		Flaws in manufacturer quality control process - Engine systems and / or components		V				
182		Flaws in aircraft system maintenance process definition - Engine combustor		V				
183		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine combustor		V				
184		Flaws in manufacturer quality control process - Engine combustor		V				
185		Flaws in aircraft system maintenance process definition - Engine turbine components		V				
186		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine turbine components		٧				
187		Flaws in manufacturer quality control process - Engine turbine components		V				
188		Unintuitive and / or error prone system manual - CPCS		V			٧	٧
189		Lack of adherence to AFM in terms of emergency procedures - engine restart procedure		٧				
190		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components		٧				
191		Flaws in manufacturer quality control process - APU systems and / or components		٧				
192		Flaws in aircraft system maintenance process definition - APU systems and / or components		V				
193		Lack of adherence to SOP in terms of awareness on supporting systems warning		٧				
194		Unintuitive and / or error prone system manual - ECAM		V				



	Safety Performance	D		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
195		Flaws in manufacturer quality control process - Engine sensors		٧				
196		Flaws in aircraft system maintenance process definition - Engine sensors		٧				
197		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine sensors		٧				
198		Lack of English proficiency		V			٧	
199		Incorrect or confusing / misleading ATC instructions		V			٧	
200		Use of non-standard phraseology by pilot and/or controller		٧			V	
201		Traffic controller tiredness - Inadequate workload distribution		٧			V	
202		Flaws in traffic controller requirements definition process and/or training methodology		٧			V	
203		Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.					V	
204		Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.					٧	
205		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					V	
206		Incorrect stab-trim setting					V	
207		Slow rotation (i.e., low pitch rate)					V	
208		Lack of adherence to SOP for take-off procedure in terms of speed bug checklist preparation and verification.					V	
209		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FCS system or components					٧	
210		Flaws in manufacturer quality control process - FCS system components					V	
211		Flaws in aircraft system maintenance process definition - FCS systems or components					V	
212		Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots					V	
213		Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications					٧	
214		Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.					V	
215		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence					V	
216		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity					V	
217		Lack of or poor communication quality					٧	
218		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver					٧	
219		Takeoff without clearance					٧	
220		Landing without clearance					٧	



	Safety Performance	Drocursors		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
221		Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings					V	
222		Flaws in CRM training procedures					V	
223		Lack of adherence to the main CRM rules					V	
224		Lack of adherence to Rules of the Air - adherence to Controller clearance					V	
225		Flaws in Airspace and Air Traffic planning procedures design process					V	
226		Flaws in airport capacity management process					V	
227		Lack of adherence to SOP for take-off procedure in terms of time limitation for take-off preparation.					V	
228		Late rejected takeoff decision / initiation					V	
229		Poor application of T/O & RTO procedure, failure recognition and preparedness					V	
230		Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations					V	
231		Lack of adherence to the SOP in terms of critical maneuvre execution - flare		V				
232		Lack of adherence to SOP for GND movements.		V				
233		Error in calculation of necessary amount of fuel		٧				
234		Lack of adherence to emergency procedures - flight deck smoke procedure		V				
235		Extreme operation condition / poor maintenance quality / advanced life lenght		V				
236		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components		٧				
237		Flaws in aircraft system maintenance process definition - Aircraft door system and / or components		V				
238		Lack of adherence to the current technology standards in terms of flight safety and efficiency - engines location.		٧				
239		Lack of adherence to emergency procedures - control recovery						V
240		Flaws in manufacturer quality control process - CPCS system and / or components		٧				
241		Flaws in aircraft system maintenance process definition - CPCS system and / or components		٧				
242		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - CPCS system and / or components		٧				
243		Incorrect use of automation - CPCS		V				
244		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment					V	
245		Poor application of T/O & RTO procedure, braking initiation sequence					V	
246		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum					V	
247		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.	<u> </u>				V	<u> </u>



	Safety Performance	Drocursors		Op	V V V V V V V V V V V V V V V V V V V			
No.	Indicators	Precursors	1	2	3	4	5	6
248		Poor application of T/O & RTO procedure, computation of T/O parameters					V	
249		Poor application of T/O & RTO procedure, aircraft handling					٧	
250		Lack of adherence to AFM in terms of emergency procedures - engine failure		V				
251		Flaws in aircraft system maintenance process definition - Electrical wiring System		V				
252		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Electrical / wiring system components		V				
253		Flaws in manufacturer quality control process - Electrical / wiring systems components		V			<u> </u>	
131	Total number of formal safety related meetings involving at least to different type of organisations (e.g. an aerodrome and ANSP) per year	Pilot tiredness - Inadequate workload distribution	V	V	V	V	V	V
132		Flaws in pilot requirements definition process and/or training methodology	V	V	٧	V	V	V
133		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	V	V	٧	V	V	V
134		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	V	V	٧	V	V	V
135		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	V	V	V	V	V	V
136		Traffic controller tiredness - Inadequate workload distribution	V	V	٧	V	V	V
137		Flaws in traffic controller requirements definition process and/or training methodology	V	V	٧	V	V	V
138		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		V			V	V
139		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.		V			V	V
140		Lack of adherence to SOP in terms of approach and landing		V	V		<u> </u>	V
141		Lack of English proficiency	V	V	٧	V	V	
142		Lack of or poor communication quality	V		٧	V	٧	
143		Unintuitive and / or error prone system manual - CPCS		V			V	V
144		Use of non-standard phraseology by pilot and/or controller	V	V	V	V	V	
145		Lack of adherence to the SOP in terms of critical indicators cross-checking		V	V			
146		Flaws in CRM training procedures		V	V		٧	V



	Safety Performance	Ducasinosus		Operational issue 1 2 3 4 5							
No.	Indicators	Precursors	1	2	3	4	5	6			
147		Lack of adherence to the main CRM rules		V	V		٧	٧			
148		Incorrect use of automation - FMS		V	V			V			
149		Unintuitive and / or error prone system manual - FMS		V	V			V			
150		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	V		V	٧	٧				
151		Aggressive maneuvering / overcontrolling		V				V			
152		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring		٧			٧	V			
153		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		٧			٧	V			
154		Inadequate aircraft de-icing / anti-icing		V			٧				
155		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components		V			V				
156		Flaws in manufacturer quality control process - Engine systems and / or components		V			٧				
157		Incorrect or confusing / misleading ATC instructions	٧	V	V	V	٧				
158		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).		V	V			٧			
159		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)		V	V	V	V				
160		Flaws in aircraft system maintenance process definition - Fuel system compoonents		V							
161		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fuel system components		V							
162		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)		V	V	V	V				
163		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)		V	V	V	٧				
164		Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing		٧				V			
165		Lack of adherence to SOP in terms of de-icing / anti-icing procedures.		V			٧				
166		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.		V	V			٧			
167		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components			V	V	٧				
168		Flaws in manufacturer quality control process - Onboard navigational systems and components.			V	V	٧				
169		Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather.		V				٧			
170		Current airport diagram not reflecting critical changes	V		V						
171		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Integrity of primary aircraft structure.		V							



	Safety Performance	Precursors		Op	eration	al issue	2	
No.	Indicators	Precursors	1	2	3	4	5	6
172		Flaws in manufacturer quality control process - Integrity of primary aircraft structure.		V				
173		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path		V				٧
174		Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.		V				
175		Lack of adherence to emergency procedures - control recovery		V				V
176		Altimeter setting error	ļ		٧	V		
177		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.		V			V	
178		Flaws in aircraft system maintenance process definition - Components of Wing control surface system.		V			V	
179		Flaws in manufacturer quality control process - Components of Wing control surface system.		V			٧	
180		Lack of adherence to SARPs in terms of avoiding adverse weather conditions during flight	ļ	V				
181		Lack of adherence to SOP in terms of AFM limitations		V				
182		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					٧	
183		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components		V			V	
184		Flaws in aircraft system maintenance process definition - APU systems and / or components		٧			٧	
185		Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure		V				V
186		Flaws in manufacturer quality control process - Fuel system components.		V				
187		Flaws in aircraft system maintenance process definition - Landing gear components.		V				
188		Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.	V				٧	
189		Flaws in manufacturer quality control process - Landing gear components.		V				
190		Flaws in aircraft system maintenance process definition - Engine systems and / or components		V			٧	
191		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine anti-ice systems and / or components		٧				
192		Flaws in manufacturer quality control process - Engine anti-ice system and / or components		V				
193		Flaws in aircraft system maintenance process definition - Engine anti-ice system and / or components		V				
194		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.			٧	V	V	
195		Hearback ommitted	V			V		
196		Incorrect use of automation -Engine anti-ice system		٧				
197		Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems		V	V			



	Safety Performance	Precursors		Ор	eration	al issu	е	
No.	Indicators	riecuisois	1	2	3	4	5	6
		against contamination						
198		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Reduction gear in the engine		V				
199		Flaws in manufacturer quality control process - Reduction gear in the engine.		V				
200		Flaws in aircraft system maintenance process definition - Reduction gear in the engine.		V				
201		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence	V				٧	
202		Inadequate de-icing method applied		V				
203		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Compressor in the engine		V				
204		Flaws in manufacturer quality control process - Compressor in the engine.		V				
205		Flaws in aircraft system maintenance process definition - Compressor in the engine.		V				1
206		Flaws in manufacturer quality control process - Engine accessory drive components.		V				1
207		Flaws in aircraft system maintenance process definition - Engine accessory drive components.		V				1
208		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine accessory drive components.		V				
209		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ECAM (or similar) system components.		V				
210		Lack of adherence to emergency procedures - Fuel starvation		V				1
211		Flaws in aircraft system maintenance process definition - Oil distribution system		V				1
212		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Oil distribution system		V				
213		Flaws in manufacturer quality control process - Oil distribution system		V				1
214		Flaws in manufacturer quality control process - APU systems and / or components		V			٧	
215		Flaws in manufacturer quality control process - Fire extinguishing system components		V		V	٧	1
216		Lack of adherence to SOP for GND movements.	V	V				
217		Flaws in aircraft system maintenance process definition - ECAM (or similar) system components.		V				
218		Unintuitive and / or error prone system manual - Engine anti-icing system		V				
219		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ECAM.		V				
220		Lack of adherence to Rules of the Air - adherence to Controller clearance				٧	٧	1
221		Flaws in manufacturer quality control process - ECAM (or similar) system components.		V				1
222		Flaws in Airspace and Air Traffic planning procedures design process				٧	٧	



	Safety Performance	Ducasinosia		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
223		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity	V				٧	
224		Flaws in aircraft system maintenance process definition - Electrical wiring System		V			V	<u> </u>
225		Flaws in aircraft system maintenance process definition - Engine combustor		V				<u> </u>
226		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine combustor		V				
227		Flaws in manufacturer quality control process - Engine combustor		V				<u> </u>
228		Flaws in aircraft system maintenance process definition - Engine turbine components		V				
229		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine turbine components		٧				
230		Flaws in manufacturer quality control process - Engine turbine components		V				
231		Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.					V	
232		Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.					V	
233		Incorrect stab-trim setting					٧	
234		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS)			٧			
235		Failure to check navigation accuracy before approach			V			
236		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. Navigational aid failure.			V			
237		Not recognized ground Navaids System failure not reflected in NOTAM messages			V			
238		High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,)		٧				٧
239		Late deceleration and configuration set-up for approach and landing		٧				٧
240		Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS)			V			1
241		Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS)			V			
242		Inadvertent deviation from cleared taxi route	V					
243		Lack of adherence to SOP for AIR operations in terms of controller error in approach clearence instruction			V			
244		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components		٧			V	
245		Flaws in aircraft system maintenance process definition - Hydraulic System		٧			٧	-
246		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.				٧	٧	
247		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance				٧	V	1



	Safety Performance	Duranturana		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
		with requirements - Communication equipment systems and components.						
248		Flaws in manufacturer quality control process - Communication equipment systems and components.				V	٧	
249		Tactical or / and Planning Controller tiredness - Inadequate workload distribution				V		
250		Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology				V		
251		Navigation deviation				V	٧	
252		Poor application of T/O & RTO procedure, aircraft handling					V	
253		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum		V			٧	V
254		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components		V			V	
255		Takeoff without clearance	V				V	
256		Landing without clearance	V				٧	
257		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake)	V				٧	
258		Poor application of T/O & RTO procedure, failure recognition and preparedness					٧	
259		Flaws in aircraft system maintenance process definition - Fire detection system components		V			٧	
260		Flaws in manufacturer quality control process - Fire detection system components		V			٧	
261		Flaws in aircraft system maintenance process definition - Fire warning system		V			٧	
262		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system		V			٧	
263		Flaws in manufacturer quality control process - Fire warning system		V			٧	
264		Lack of adherence to AFM limitations for Take-off		V			٧	
265		Inadequate coordination between ATM centers and/or ATC sectors				V		
266		Unstabilized final approach (high, fast, steep,)		V				V
267		Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	V				٧	
268		Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	V				٧	
269		Difference indications of independent aircraft speed / altitude or attitude indicators		V				
270		Inadequate maintenance of fire vulnerable aircraft parts or components		٧				
271		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements in terms of fire resistance		V				
272		Lack of adherence to regulations concerning transport of DGR goods		V				



	Safety Performance	Ducasinopue		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
273		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Electrical / wiring system components		V				
274		Flaws in manufacturer quality control process - Electrical / wiring systems components		V				
275		Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications	V				٧	
276		Unintuitive and / or error prone system manual - FMC					V	
277		Lack of adherence to SOP in terms of fuelling procedure		V				
278		Undetected incorrect takeoff configuration					V	
279		Unintuitive and / or error prone system manual - communication equipment.				V		
280		Altitude deviation				V		
281		Level bust (pilot lapse or late re-clearance by ATC)				٧		
282		Flaws in conflict and separation minima infringement detection / elimination procedures				V		
283		Lack of adherence of airlines to time contraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data.				٧		
284		Incorrect use of communication equipment				V		
285		Separation of structural element / component of the aircraft during take-off or landing		V				
286		Lack of adherence to engine limitations		V				
287		Failure to remember / assess crosswind component limit for prevailing runway condition					٧	٧
288		Failure to comply with an altitude or speed restriction / constraint				V		
289		Deviation from flight trajectory commanded by controller				V		
290		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Anti-icing system components		V				
291		Lack of adherence to SOP for take-off procedure in terms of altimeter callibration.				V		
292		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MTCD System				٧		
293		Lack of adherence of airlines to declared Flight Plan.				V		
294		Failure to identify the pre-tactical conflict before it reach the tactical controller				٧		
295		Lack of adherence to SOP for Airborne operation in terms of minimum seprataion				V		
296		Military activity in controlled airport or located within controlled area				V		
297		General aviation activity in controlled airport or located within controlled area				٧		
298		Intensified traffic related to general aviation activity e. g. over GA airport / airfield				٧		
			1					4



	Safety Performance	Duranteen		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
299		Excessive pitch attitude		V				
300		Excessive bank angle		٧				
301		Flaws in manufacturer quality control process - Anti-icing system components		V				
302		Flaws in aircraft system maintenance process definition - Anti-icing systems components		٧				
303		DME / ILS DME confusion in assessing the final descent point / FAF		٧				٧
304		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components		٧			V	
305		Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling		V			V	<u> </u>
306		Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared		٧				V
307		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System.		V				٧
308		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of fire detection / warning or / and extinguishing system.		٧				
309		Flaws in manufacturer quality control process - Power supply system components		V			V	
310		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system		V				V
311		Lack of adherence to AFM in terms of emergency procedures - stall recovery		V			٧	
312		Flaws in manufacturer quality control process - PWS system components		٧				V
313		Imbalanced and inaproppriate relation between cpt and his subordinates			V			
314		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.		٧				٧
315		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - LLWAS system		V				V
316		Flaws in aircraft system maintenance process definition - Fire extinguishing system components		V			V	<u> </u>
317		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components					V	
318		Callsign confusion	V					<u> </u>
319		Unintuitive and / or error prone system manual - ground radar.	V				V	<u> </u>
320		Lack of adherence to SOP in terms of aircraft icing (condition) monitoring		V			V	<u> </u>
321		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FCS system or components		٧			V	
322		Flaws in manufacturer quality control process - FCS system components		٧			٧	
323		Flaws in aircraft system maintenance process definition - FCS systems or components		V			٧	



	Safety Performance	Precursors		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
324		Lack of adherence to SOP in terms of ATCO and approach or ground controller communication	V					
325		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground Radar	V					
326		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ground radar at the airport.	V					
327		Lack of adherence to SOP in terms of awareness on supporting systems (warning) - ground radar.	V					
328		Late rejected takeoff decision / initiation					V	
329		Descent above desired descent profile		V				٧
330		Lack of adherence to AFM limitations for landing		V				٧
331		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine		V			V	
332		Flaws in manufacturer quality control process - Autothrottle system in the engine.		V			V	
333		Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.		V			V	
334		Lack of adherence to AFM in terms of emergency procedures - engine restart procedure		V				
335		Lack of adherence to SOP in terms of awareness on supporting systems warning		V				
336		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment	V					
337		Unintuitive and / or error prone system manual - ECAM		V				
338		Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations					V	
339		Tailwind component above limit						٧
340		Flaws in manufacturer quality control process - Engine sensors		V				
341		Flaws in aircraft system maintenance process definition - Engine sensors		V				
342		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine sensors		V				
343		Lack of adherence to emergency procedures - WEM		V				٧
344		Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.		V			V	
345		Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT)		V			٧	
346		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - antiice fluid HOT		V			V	
347		Lack of adherence to SOP in terms of safety best practices		V				
348		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ADI system components		V		V		



	Safety Performance	Ducasiyaaya						
No.	Indicators	Precursors	1	2	3	4	5	6
349		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of STCA System.				V		
350		Lack of adherence to regulations concerning independent ATCO monitoring				٧		1
351		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - STCA System				٧		
352		Lack of adherence to AFM in terms of emergency procedures - fire detection and extinguishing procedure		V				1
353		Lack of adherence to SOP for GND movements. Poor execution of parking / docking /pushback procedure	V					
354		Go-around attempt after thrust reversers deployment		V				٧
355		Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing		V			V	
356		Flaws in aircraft system maintenance process definition - ADI system components		V				1
357		Flaws in manufacturer quality control process - ADI system components		V				
358		Slow rotation (i.e., low pitch rate)					٧	
359		Lack of adherence to emergency procedures - RWY collision avoidance	V					
360		Incorrect use of automation - TOCW System					٧	
361		Flaws in aircraft system maintenance process definition - TOCW System					٧	
362		Unintuitive and / or error prone system manual - TOCW					V	
363		Inadequate effectivenes of fire extinguishing system		V				
364		Lack of adherence to the SOP in terms of critical maneuvre execution		V				
365		Applied de-icing / anti-icing method is not sufficient for predicted conditions		V			V	
366		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System					٧	
367		Incorrect use of automation - Anti-icing system		V				1
368		Unintuitive and / or error prone system manual - Anti-icing system		V				
369		Lack of adherence to SOP in terms of pre-flight inspections -presence of anti-contamination covers on pitot static tube		V				
370		Lack of adherence to SOP in terms of briefing and checklist before initiating of start of taxiing and take-off		V				
371		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Pitot static system components		V				
372		Flaws in manufacturer quality control process - Pitot static system components		V				
373		Flaws in aircraft system maintenance process definition - Pitot static systems components		V				
374		Lack of adherence to SOP for take-off procedure in terms of speed bug checklist preparation and verification.					V	
375		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance		V				



	Safety Performance	Precursors		Op	eration	al issue	2	
No.	Indicators	Precursors	1	2	3	4	5	6
		with requirements - ADI						
376		Flaws in manufacturer quality control process - ADI		V				
377		Flaws in aircraft system maintenance process definition - ADI		V				
378		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ASI		V				
379		Flaws in manufacturer quality control process - ASI		٧				
380		Flaws in aircraft system maintenance process definition - ASI		٧				
381		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PFD		٧				
382		Flaws in manufacturer quality control process - PFD		٧				
383		Flaws in aircraft system maintenance process definition - PFD		V				l
384		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine fuel distribution system		V				
385		Flaws in manufacturer quality control process - Engine fuel distribution system		٧				
386		Flaws in aircraft system maintenance process definition - Engine fuel distribution system		V				
387		Unintuitive and / or error prone system manual - fire extinguishing system		٧				
388		Flaws in aircraft system maintenance process definition - stickshaker		>	٧		٧	
389		Late activation of pedal braking or takeover from autobrake, when so required		V				٧
390		Delayed selection of reverse thrust		V				٧
391		Inappropriate selection of autobrake mode for given runway length and condition		٧				٧
392		Poor application of T/O & RTO procedure, braking initiation sequence					V	
393		Lack of adherence to SOP in terms of requested information support for other aircraft in terms of adverse weather conditions		٧				
394		Lack of adherence to SOP in terms of application of findings from weather report		٧				
395		Lack of adherence to SOP in terms of AFM limitations in terms of weigh and balance		>				
396		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - stickshaker system components		V			V	
397		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment					V	
398		Flight below maneuvering speeds		٧				
399		Lack of adherence to SOP in terms of awareness on supporting systems warning - stickshaker		٧			٧	
400		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.					V	_



	Safety Performance	Duranteen		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
401		Incorrect weather report obtained by the flight crew		V			<u> </u>	
402		Lack of adherence to SOP in terms of providing flight crew with current weather report		V			1	
403		Lack of adherence of passengers to the recommendation: Fasten seat belt while seated		V				
404		Lack of adherence to SOP in terms of "fasten your seat belt" information activation in passenger cabin during flight in turbulence conditions		V				
405		Lack of adherence to SOP in terms of load sheet preparation and verification		V			<u> </u>	
406		Lack of adherence to the current technology standards in terms of flight safety and efficiency - fuel tank allocation.		V			<u> </u>	
407		Lack of adherence to emergency procedures - recovery from severe FCS failure		V				
408		Flaws in airport capacity management process					V	
409		Unintuitive and / or error prone system manual - On-board weather radar.		٧			1	
410		Incorrect use of automation - On-board weather radar		٧			1	
411		Lack of adherence to SOP for take-off procedure in terms of time limitation for take-off preparation.					V	
412		Inadequate airline / regulatory provider policy in terms of aware of the risks related to air travel		V			1	
413		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - On-board weather radar		V				
414		Flaws in manufacturer quality control process - On-board weather radar		٧				
415		Flaws in aircraft system maintenance process definition - On-board weather radar		V				
416		Poor application of T/O & RTO procedure, computation of T/O parameters					V	
417		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Rudder components.		V				
418		Flaws in aircraft system maintenance process definition - Rudder components.		V			<u> </u>	
419		Flaws in manufacturer quality control process - Rudder components.		٧			1	
420		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Horizontal stabilizer components.		V				
421		Flaws in aircraft system maintenance process definition - Horizontal stabilizer components.		V				
422		Flaws in manufacturer quality control process - Horizontal stabilizer components.		٧				
423		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Thrust reverse system in the engine.		V				
424		Flaws in manufacturer quality control process - Thrust reverse system in the engine.		٧				
425		Flaws in aircraft system maintenance process definition - Thrust reverse system in the engine.		٧				
426		Inadequate crosswind landing / decrab technique						V



	Safety Performance	Ducasinosus		V V V V V V V V V V V V V V V V V V V				
No.	Indicators	Precursors	1	2	3	4	5	6
427		Touchdown off centerline						٧
428		Inappropriate use of differential reverse thrust						٧
429		Lack of adherence to SOP in terms of pre-flight inspections - cargo securing quality		V				
430		Inadequate use of differential braking						٧
431		Use of nose wheel steering tiller during rollout						٧
432		Lack of adherence to SOP in terms of awareness on supporting systems (warning) - RIMCAS.	V					
433		Error in calculation of necessary amount of fuel		V				٧
434		Lack of adherence to SOP in terms of pre-flight inspections - ice presence on aircraft		V				
435		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components		V				
436		Flaws in aircraft system maintenance process definition - Aircraft door system and / or components		V				
437		Long / floating flare						٧
438		Flaws in manufacturer quality control process - CPCS system and / or components		V				
439		Flaws in aircraft system maintenance process definition - CPCS system and / or components		V				
440		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - CPCS system and / or components		V				
441		Lack of adherence to ICAO Annex 14 and related documents in terms of airside lights distribution	V					
442		Lack of adherence to ICAO Annex 14 and related documents in terms of nonrestricted view on airsite from TWR	V					
443		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of Runway Conflict Warning System.	V					
444		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - RCWS	V					
445		Lack of adherence to TO procedure in terms of antiice protection		V				
446		Flaws in manufacturer quality control process - anti-ice fluid specifications (HOT)		V				
447		Lack of adherence to emergency procedures - flight deck smoke procedure		٧				
448		Lack of adherence to the SOP in terms of critical maneuvre execution - flare		V				
449		Extreme operation condition / poor maintenance quality / advanced life lenght		٧				
450		Incorrect use of automation - CPCS		V				
451		Failure to arm ground-spoilers		٧				٧
452		Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain)			V			



	Safety Performance	Precursors		Operational issue 1 2 3 4 5						
No.	Indicators	Precursors	1	2	3	4	5	6		
453		Premature descent to DA(H) before G/S intercept or premature descent to MDA(H) before final-descent-point / FAF			V					
454		Premature descent below MDA(H) before reaching the visual-descent-point (VDP)			V					
455		Flight below desired flight path during initial and/or final approach			V					
456		Continued approach, when below DA(H) or MDA(H), after loss of visual references			V					
457		Late or inadequate response to MSAW warning			V					
458		Failure to go-around, when so required			V					
459		Failure to follow published missed-approach procedure			V					
460		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of MSAW system.			V					
461		Lack of adherence to AFM in terms of emergency procedures - windshear recovery		٧						
462		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MSAW System			V					
463		Lack of adherence to the current technology standards in terms of flight safety and efficiency - engines location.		V				<u> </u>		
464		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. MSAW warning.			V					
465		Late thrust reduction or power-on touchdown		V				V		
466		Use of non-standard phraseology by pilot flying (PF) and/or pilot not flying (PNF)		V						
467		Lack of adherence to SOP in terms of necessary amount of fuel		V				V		
468		Flaws in manufacturer quality control process - Stickshaker system components		V			٧			
469		Lack of adherence to AFM in terms of emergency procedures - engine failure		٧				1		
470		Inadequate stall recovery procedure for the aircraft					٧			
471		Inadequate management / separation of takeoffs and landings	V					1		
472		Flaws in manufacturer quality control process - TOCW system components					٧			
473		Lack of adherence to SOP for approach and landing		V						
474		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment		V						
475		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ACAS system components				٧				
476		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS			V					
477		Inappropriate visual avoidance maneuver				V				
478		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ACAS installed on aircraft.				٧				
479		Late or inadequate response to ACAS warning				٧				



	Safety Performance	Dunassurana		Op	Operational issue						
No.	Indicators	Precursors	1	2	3	4	5	6			
480		Taxiing without clearance		V			<u> </u>				
481		Flaws in aircraft system maintenance process definition - GPWS system components			٧		1				
482		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - GPWS system components			٧						
483		Flaws in manufacturer quality control process - GPWS system components			V		l				
131	Total number of formal meetings of network of analysts to discuss safety performance measurement	Pilot tiredness - Inadequate workload distribution	V	٧	V	V	V	>			
132		Flaws in pilot requirements definition process and/or training methodology	V	V	V	V	V	V			
133		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	V	V	V	V	V	V			
134		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	٧	V	٧	V	V	V			
135		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	V	V	V	V	V	٧			
136		Traffic controller tiredness - Inadequate workload distribution	٧	V	٧	V	V	V			
137		Flaws in traffic controller requirements definition process and/or training methodology	٧	V	>	V	V	٧			
138		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		٧			٧	٧			
139		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.		V			V	V			
140		Lack of adherence to SOP in terms of approach and landing		V	٧		<u> </u>	V			
141		Lack of English proficiency	٧	V	V	V	V				
142		Lack of or poor communication quality	٧		٧	V	V				
143		Unintuitive and / or error prone system manual - CPCS		V			V	V			
144		Use of non-standard phraseology by pilot and/or controller	V	V	V	V	V				
145		Lack of adherence to the SOP in terms of critical indicators cross-checking		V	V						
146		Flaws in CRM training procedures		V	V		٧	V			
147		Lack of adherence to the main CRM rules		V	V		V	٧			
148		Incorrect use of automation - FMS		٧	V			٧			
149		Unintuitive and / or error prone system manual - FMS		٧	٧			V			
150		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	٧		٧	V	٧				
151		Aggressive maneuvering / overcontrolling		V			1	V			



	Safety Performance	Precursors		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
152		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring		V			V	V
153		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		V			V	٧
154		Inadequate aircraft de-icing / anti-icing		V			V	
155		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components		V			V	
156		Flaws in manufacturer quality control process - Engine systems and / or components		V			V	
157		Incorrect or confusing / misleading ATC instructions	V	V	V	V	٧	
158		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).		٧	V			٧
159		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)		٧	>	٧	V	
160		Flaws in aircraft system maintenance process definition - Fuel system compoonents		V				
161		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fuel system components		V				
162		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)		V	V	V	V	
163		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)		V	V	V	V	
164		Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing		V				V
165		Lack of adherence to SOP in terms of de-icing / anti-icing procedures.		V			V	
166		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.		V	V			٧
167		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components			V	V	V	
168		Flaws in manufacturer quality control process - Onboard navigational systems and components.			V	V	V	
169		Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather.		٧				٧
170		Current airport diagram not reflecting critical changes	V		V			
171		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Integrity of primary aircraft structure.		٧				
172		Flaws in manufacturer quality control process - Integrity of primary aircraft structure.		V				
173		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path		V				٧
174		Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.		٧				
175		Lack of adherence to emergency procedures - control recovery		V				V



	Safety Performance	Precursors		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
176		Altimeter setting error			V	V		
177		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.		V			V	
178		Flaws in aircraft system maintenance process definition - Components of Wing control surface system.		V			V	
179		Flaws in manufacturer quality control process - Components of Wing control surface system.		V			V	
180		Lack of adherence to SARPs in terms of avoiding adverse weather conditions during flight		V				
181		Lack of adherence to SOP in terms of AFM limitations		V				
182		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					V	
183		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components		V			V	
184		Flaws in aircraft system maintenance process definition - APU systems and / or components		V			V	
185		Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure		V				V
186		Flaws in manufacturer quality control process - Fuel system components.		V				
187		Flaws in aircraft system maintenance process definition - Landing gear components.		V				
188		Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.	V				V	
189		Flaws in manufacturer quality control process - Landing gear components.		V				
190		Flaws in aircraft system maintenance process definition - Engine systems and / or components		V			V	
191		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine anti-ice systems and / or components		٧				
192		Flaws in manufacturer quality control process - Engine anti-ice system and / or components		V				
193		Flaws in aircraft system maintenance process definition - Engine anti-ice system and / or components		V				
194		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.			V	V	V	
195		Lack of adherence to SOP for GND movements.	V	V				
196		Hearback ommitted	V			V		
197		Incorrect use of automation -Engine anti-ice system		V				
198		Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination		٧	V			
199		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Reduction gear in the engine		٧				
200		Flaws in manufacturer quality control process - Reduction gear in the engine.		V			 	



	Safety Performance	Precursors		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
201		Flaws in aircraft system maintenance process definition - Reduction gear in the engine.		V				<u> </u>
202		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence	V				٧	
203		Inadequate de-icing method applied		V				
204		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Compressor in the engine		V				
205		Flaws in manufacturer quality control process - Compressor in the engine.		V				<u> </u>
206		Flaws in aircraft system maintenance process definition - Compressor in the engine.		V				<u> </u>
207		Flaws in manufacturer quality control process - Engine accessory drive components.		V				
208		Flaws in aircraft system maintenance process definition - Engine accessory drive components.		V				
209		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine accessory drive components.		٧				
210		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ECAM (or similar) system components.		٧				
211		Lack of adherence to emergency procedures - Fuel starvation		V				
212		Flaws in aircraft system maintenance process definition - Oil distribution system		V				
213		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Oil distribution system		٧				
214		Flaws in manufacturer quality control process - Oil distribution system		V				
215		Flaws in manufacturer quality control process - APU systems and / or components		V			V	
216		Flaws in manufacturer quality control process - Fire extinguishing system components		V		V	V	
217		Flaws in aircraft system maintenance process definition - ECAM (or similar) system components.		V				
218		Unintuitive and / or error prone system manual - Engine anti-icing system		٧				
219		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ECAM.		V				
220		Lack of adherence to Rules of the Air - adherence to Controller clearance				V	V	
221		Flaws in manufacturer quality control process - ECAM (or similar) system components.		V				
222		Flaws in Airspace and Air Traffic planning procedures design process				V	٧	
223		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity	V				V	
224		Flaws in aircraft system maintenance process definition - Electrical wiring System		V			V	 L
225		Flaws in aircraft system maintenance process definition - Engine combustor		٧				
226		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance		٧				



	Safety Performance	Durantina		Ор	eration	al issu	<u></u>	
No.	Indicators	Precursors	1	2	3	4	5	6
		with requirements - Engine combustor						
227		Flaws in manufacturer quality control process - Engine combustor		V				
228		Flaws in aircraft system maintenance process definition - Engine turbine components		V				
229		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine turbine components		V				
230		Flaws in manufacturer quality control process - Engine turbine components		V				
231		Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.					٧	
232		Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.					٧	
233		Incorrect stab-trim setting					٧	
234		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS)			٧			
235		Failure to check navigation accuracy before approach			V			
236		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. Navigational aid failure.			V			
237		Not recognized ground Navaids System failure not reflected in NOTAM messages			V			
238		High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,)		٧				V
239		Late deceleration and configuration set-up for approach and landing		٧				٧
240		Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS)			V			
241		Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS)			V			
242		Inadvertent deviation from cleared taxi route	V					
243		Lack of adherence to SOP for AIR operations in terms of controller error in approach clearence instruction			V			
244		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components		٧			V	
245		Flaws in aircraft system maintenance process definition - Hydraulic System		٧			V	
246		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.				V	V	
247		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.				V	V	
248		Flaws in manufacturer quality control process - Communication equipment systems and components.				V	V	
249		Tactical or / and Planning Controller tiredness - Inadequate workload distribution				٧		
250		Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology				V		



	Safety Performance	D		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
251		Navigation deviation				V	V	
252		Poor application of T/O & RTO procedure, aircraft handling					V	
253		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum		V			V	V
254		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components		V			V	
255		Takeoff without clearance	V				V	
256		Landing without clearance	V				V	
257		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake)	V				V	
258		Poor application of T/O & RTO procedure, failure recognition and preparedness					V	
259		Flaws in aircraft system maintenance process definition - Fire detection system components		V			V	
260		Flaws in manufacturer quality control process - Fire detection system components		V			V	
261		Flaws in aircraft system maintenance process definition - Fire warning system		٧			٧	
262		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system		V			٧	
263		Flaws in manufacturer quality control process - Fire warning system		V			V	
264		Lack of adherence to AFM limitations for Take-off		V			V	
265		Inadequate coordination between ATM centers and/or ATC sectors				V		
266		Unstabilized final approach (high, fast, steep,)		V				V
267		Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	V				V	
268		Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	V				V	
269		Difference indications of independent aircraft speed / altitude or attitude indicators		V				
270		Inadequate maintenance of fire vulnerable aircraft parts or components		V				
271		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements in terms of fire resistance		V				
272		Lack of adherence to regulations concerning transport of DGR goods		V				
273		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Electrical / wiring system components		V				
274		Flaws in manufacturer quality control process - Electrical / wiring systems components		V				
275		Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications	V				٧	



	Safety Performance	Duanimanua		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
276		Unintuitive and / or error prone system manual - FMC					V	
277		Lack of adherence to SOP in terms of fuelling procedure		>				
278		Undetected incorrect takeoff configuration					V	
279		Unintuitive and / or error prone system manual - communication equipment.				V		
280		Altitude deviation				V		
281		Level bust (pilot lapse or late re-clearance by ATC)				V		
282		Flaws in conflict and separation minima infringement detection / elimination procedures				V		
283		Lack of adherence of airlines to time contraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data.				V		
284		Incorrect use of communication equipment				V		
285		Separation of structural element / component of the aircraft during take-off or landing		V				
286		Lack of adherence to engine limitations		٧				
287		Failure to remember / assess crosswind component limit for prevailing runway condition					V	V
288		Failure to comply with an altitude or speed restriction / constraint				V		
289		Deviation from flight trajectory commanded by controller				V		
290		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Anti-icing system components		V				
291		Lack of adherence to SOP for take-off procedure in terms of altimeter callibration.				V		
292		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MTCD System				V		
293		Lack of adherence of airlines to declared Flight Plan.				V		
294		Failure to identify the pre-tactical conflict before it reach the tactical controller				V		
295		Lack of adherence to SOP for Airborne operation in terms of minimum seprataion				V		
296		Military activity in controlled airport or located within controlled area				V		
297		General aviation activity in controlled airport or located within controlled area				V		
298		Intensified traffic related to general aviation activity e.g. over GA airport / airfield				V		
299		Excessive pitch attitude		V				
300		Excessive bank angle		V				
301		Flaws in manufacturer quality control process - Anti-icing system components		٧				
302		Flaws in aircraft system maintenance process definition - Anti-icing systems components		٧				



	Safety Performance	Precursors		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
303		DME / ILS DME confusion in assessing the final descent point / FAF		V				٧
304		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components		V			٧	
305		Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling		V			V	
306		Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared		V				V
307		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System.		V				٧
308		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of fire detection / warning or / and extinguishing system.		V				
309		Flaws in manufacturer quality control process - Power supply system components		V			V	
310		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system		V				V
311		Lack of adherence to AFM in terms of emergency procedures - stall recovery		V			V	
312		Flaws in manufacturer quality control process - PWS system components		V				V
313		Imbalanced and inaproppriate relation between cpt and his subordinates			V			
314		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.		V				V
315		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - LLWAS system		V				٧
316		Flaws in aircraft system maintenance process definition - Fire extinguishing system components		V			٧	
317		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components					V	
318		Callsign confusion	V					
319		Unintuitive and / or error prone system manual - ground radar.	V				V	
320		Lack of adherence to SOP in terms of aircraft icing (condition) monitoring		V			V	
321		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FCS system or components		V			٧	
322		Flaws in manufacturer quality control process - FCS system components		V			٧	
323		Flaws in aircraft system maintenance process definition - FCS systems or components		V			V	
324		Lack of adherence to SOP in terms of ATCO and approach or ground controller communication	V					
325		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground Radar	٧					
326		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ground radar at the airport.	V					



	Safety Performance	Precursors		Ор	eration	al issu	е	
No.	Indicators	Precursors	1	2	3	4	5	6
327		Lack of adherence to SOP in terms of awareness on supporting systems (warning) - ground radar.	V					
328		Late rejected takeoff decision / initiation					٧	
329		Descent above desired descent profile		V				V
330		Lack of adherence to AFM limitations for landing		V				V
331		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine		V			٧	
332		Flaws in manufacturer quality control process - Autothrottle system in the engine.		٧			٧	
333		Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.		V			٧	
334		Lack of adherence to AFM in terms of emergency procedures - engine restart procedure		V				
335		Lack of adherence to SOP in terms of awareness on supporting systems warning		٧				
336		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment	V					
337		Unintuitive and / or error prone system manual - ECAM		V				
338		Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations					٧	
339		Tailwind component above limit						V
340		Flaws in manufacturer quality control process - Engine sensors		V				
341		Flaws in aircraft system maintenance process definition - Engine sensors		V				
342		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine sensors		V				
343		Lack of adherence to emergency procedures - WEM		V				V
344		Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.		V			٧	
345		Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT)		V			٧	
346		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - antiice fluid HOT		V			V	
347		Lack of adherence to SOP in terms of safety best practices		٧				
348		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ADI system components		V		V		
349		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of STCA System.				V		
350		Lack of adherence to regulations concerning independent ATCO monitoring				٧		
351		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - STCA System				V		



	Safety Performance	Ducasiyaaya		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
352		Lack of adherence to AFM in terms of emergency procedures - fire detection and extinguishing procedure		V				<u> </u>
353		Lack of adherence to SOP for GND movements. Poor execution of parking / docking /pushback procedure	V					
354		Go-around attempt after thrust reversers deployment		٧				V
355		Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing		٧			٧	
356		Flaws in aircraft system maintenance process definition - ADI system components		٧				
357		Flaws in manufacturer quality control process - ADI system components		٧				
358		Slow rotation (i.e., low pitch rate)					٧	
359		Lack of adherence to emergency procedures - RWY collision avoidance	V					
360		Incorrect use of automation - TOCW System					٧	
361		Flaws in aircraft system maintenance process definition - TOCW System					٧	
362		Unintuitive and / or error prone system manual - TOCW					٧	
363		Inadequate effectivenes of fire extinguishing system		V				
364		Lack of adherence to the SOP in terms of critical maneuvre execution		٧				
365		Applied de-icing / anti-icing method is not sufficient for predicted conditions		٧			V	
366		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System					V	
367		Incorrect use of automation - Anti-icing system		V				<u> </u>
368		Unintuitive and / or error prone system manual - Anti-icing system		٧				
369		Lack of adherence to SOP in terms of pre-flight inspections -presence of anti-contamination covers on pitot static tube		٧				
370		Lack of adherence to SOP in terms of briefing and checklist before initiating of start of taxiing and take-off		٧				
371		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Pitot static system components		V				
372		Flaws in manufacturer quality control process - Pitot static system components		V				<u> </u>
373		Flaws in aircraft system maintenance process definition - Pitot static systems components		٧				
374		Lack of adherence to SOP for take-off procedure in terms of speed bug checklist preparation and verification.					V	
375		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ADI		٧				
376		Flaws in manufacturer quality control process - ADI		V				
377		Flaws in aircraft system maintenance process definition - ADI		V				
378		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance		V				



	Safety Performance	Precursors		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
		with requirements - ASI						
379		Flaws in manufacturer quality control process - ASI		٧				
380		Flaws in aircraft system maintenance process definition - ASI		V				
381		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PFD		٧				
382		Flaws in manufacturer quality control process - PFD		V				
383		Flaws in aircraft system maintenance process definition - PFD		V				
384		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine fuel distribution system		V				
385		Flaws in manufacturer quality control process - Engine fuel distribution system		V				
386		Flaws in aircraft system maintenance process definition - Engine fuel distribution system		V				
387		Unintuitive and / or error prone system manual - fire extinguishing system		V				
388		Flaws in aircraft system maintenance process definition - stickshaker		V	>		V	
389		Late activation of pedal braking or takeover from autobrake, when so required		٧				٧
390		Delayed selection of reverse thrust		٧				V
391		Inappropriate selection of autobrake mode for given runway length and condition		٧				V
392		Poor application of T/O & RTO procedure, braking initiation sequence					V	
393		Lack of adherence to SOP in terms of requested information support for other aircraft in terms of adverse weather conditions		V				
394		Lack of adherence to SOP in terms of application of findings from weather report		V				
395		Lack of adherence to SOP in terms of AFM limitations in terms of weigh and balance		V				
396		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - stickshaker system components		٧			٧	
397		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment					V	
398		Flight below maneuvering speeds		V				
399		Lack of adherence to SOP in terms of awareness on supporting systems warning - stickshaker		٧			٧	
400		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.					٧	
401		Incorrect weather report obtained by the flight crew		V				
402		Lack of adherence to SOP in terms of providing flight crew with current weather report		V				
403		Lack of adherence of passengers to the recommendation: Fasten seat belt while seated		V				



	Safety Performance	Duantinana		Ор	eration	al issu	е	
No.	Indicators	Precursors	1	2	3	4	5	6
404		Lack of adherence to SOP in terms of "fasten your seat belt" information activation in passenger cabin during flight in turbulence conditions		V				
405		Lack of adherence to SOP in terms of load sheet preparation and verification		V				
406		Lack of adherence to the current technology standards in terms of flight safety and efficiency - fuel tank allocation.		V				
407		Lack of adherence to emergency procedures - recovery from severe FCS failure		V				
408		Flaws in airport capacity management process					٧	
409		Unintuitive and / or error prone system manual - On-board weather radar.		V				
410		Incorrect use of automation - On-board weather radar		V				
411		Lack of adherence to SOP for take-off procedure in terms of time limitation for take-off preparation.					٧	
412		Inadequate airline / regulatory provider policy in terms of aware of the risks related to air travel		V				
413		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - On-board weather radar		V				
414		Flaws in manufacturer quality control process - On-board weather radar		V				
415		Flaws in aircraft system maintenance process definition - On-board weather radar		V				
416		Poor application of T/O & RTO procedure, computation of T/O parameters					٧	
417		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Rudder components.		V				
418		Flaws in aircraft system maintenance process definition - Rudder components.		V				
419		Flaws in manufacturer quality control process - Rudder components.		V				
420		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Horizontal stabilizer components.		V				
421		Flaws in aircraft system maintenance process definition - Horizontal stabilizer components.		V				
422		Flaws in manufacturer quality control process - Horizontal stabilizer components.		V				
423		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Thrust reverse system in the engine.		V				
424		Flaws in manufacturer quality control process - Thrust reverse system in the engine.		V				
425		Flaws in aircraft system maintenance process definition - Thrust reverse system in the engine.		V				
426		Inadequate crosswind landing / decrab technique						V
427		Touchdown off centerline						V
428		Inappropriate use of differential reverse thrust						V
429		Lack of adherence to SOP in terms of pre-flight inspections - cargo securing quality		٧				



	Safety Performance	Ducasinosus		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
430		Inadequate use of differential braking						V
431		Use of nose wheel steering tiller during rollout						٧
432		Lack of adherence to SOP in terms of awareness on supporting systems (warning) - RIMCAS.	V					
433		Error in calculation of necessary amount of fuel		V				V
434		Lack of adherence to SOP in terms of pre-flight inspections - ice presence on aircraft		V				
435		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components		V				
436		Flaws in aircraft system maintenance process definition - Aircraft door system and / or components		V			<u> </u>	
437		Long / floating flare					<u> </u>	V
438		Flaws in manufacturer quality control process - CPCS system and / or components		V				
439		Flaws in aircraft system maintenance process definition - CPCS system and / or components		V				
440		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - CPCS system and / or components		V				
441		Lack of adherence to ICAO Annex 14 and related documents in terms of airside lights distribution	V					
442		Lack of adherence to ICAO Annex 14 and related documents in terms of nonrestricted view on airsite from TWR	V					
443		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of Runway Conflict Warning System.	V					
444		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - RCWS	V					
445		Lack of adherence to TO procedure in terms of antiice protection		V			<u> </u>	
446		Flaws in manufacturer quality control process - anti-ice fluid specifications (HOT)		V				
447		Lack of adherence to emergency procedures - flight deck smoke procedure		V				
448		Lack of adherence to the SOP in terms of critical maneuvre execution - flare		V				
449		Extreme operation condition / poor maintenance quality / advanced life lenght		V				
450		Incorrect use of automation - CPCS		V				
451		Failure to arm ground-spoilers		V				٧
452		Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain)			V			
453		Premature descent to DA(H) before G/S intercept or premature descent to MDA(H) before final-descent-point / FAF			V			
454		Premature descent below MDA(H) before reaching the visual-descent-point (VDP)			V			
455		Flight below desired flight path during initial and/or final approach			V			



	Safety Performance	Писанизана		Operational issue 1 2 3 4 5 V V V				
No.	Indicators	Precursors	1	2	3	4	5	6
456		Continued approach, when below DA(H) or MDA(H), after loss of visual references			٧			
457		Late or inadequate response to MSAW warning			V			
458		Failure to go-around, when so required			V			
459		Failure to follow published missed-approach procedure			>			
460		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of MSAW system.			٧			
461		Lack of adherence to AFM in terms of emergency procedures - windshear recovery		V				
462		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MSAW System			V			
463		Lack of adherence to the current technology standards in terms of flight safety and efficiency - engines location.		V				
464		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. MSAW warning.			V			
465		Inadequate stall recovery procedure for the aircraft	V				V	
466		Late thrust reduction or power-on touchdown		V				V
467		Use of non-standard phraseology by pilot flying (PF) and/or pilot not flying (PNF)		V				
468		Lack of adherence to SOP in terms of necessary amount of fuel		V				V
469		Flaws in manufacturer quality control process - Stickshaker system components		V			V	
470		Lack of adherence to AFM in terms of emergency procedures - engine failure		V				
471		Inadequate management / separation of takeoffs and landings	V					
472		Flaws in manufacturer quality control process - TOCW system components					V	
473		Lack of adherence to SOP for approach and landing		V				
474		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment		V				
475		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ACAS system components				V		
476		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS			V			
477		Inappropriate visual avoidance maneuver				V		
478		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ACAS installed on aircraft.				V		
479		Late or inadequate response to ACAS warning				V		
480		Taxiing without clearance		V				
481		Flaws in aircraft system maintenance process definition - GPWS system components			V			
482		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance			V			



	Safety Performance	Precursors		Ор	eration	al issu	e	
No.	Indicators	riecuisois	1	2	3	4	5	6
		with requirements - GPWS system components						
483		Flaws in manufacturer quality control process - GPWS system components			V			
131	The safety impact of each significant airport infrastructural change is assessed and deemed acceptable before the actual introduction of the change	Pilot tiredness - Inadequate workload distribution	V	V	V	V	V	V
132		Flaws in pilot requirements definition process and/or training methodology	V	V	V	V	V	V
133		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	V	V	V	V	V	V
134		Traffic controller tiredness - Inadequate workload distribution	V	V	V	V		
135		Flaws in traffic controller requirements definition process and/or training methodology	V	V	V	V		
136		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	V	٧	V		٧	V
137		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	V	V	V		٧	V
138		Lack of English proficiency	V	V	V	V		
139		Lack of adherence to SOP in terms of approach and landing		V	V			V
140		Use of non-standard phraseology by pilot and/or controller	V	V	V	V		
141		Flaws in CRM training procedures		V	V			٧
142		Lack of adherence to the main CRM rules		V	V			٧
143		Incorrect use of automation - FMS		V	V			٧
144		Unintuitive and / or error prone system manual - FMS		V	V			٧
145		Lack of or poor communication quality	V		V	V		
146		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	V		V	V		
147		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.		V	V			V
148		Current airport diagram not reflecting critical changes	V		V			
149		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path		V				V
150		Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather.		V				V



	Safety Performance	Duanissassa		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
151		Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing		V				٧
152		Incorrect or confusing / misleading ATC instructions	V	V		V		
153		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)			V	V		
154		Altimeter setting error			V	V		
155		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)			V	V		
156		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)			V	V		
157		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components			V	V		
158		Flaws in manufacturer quality control process - Onboard navigational systems and components.			V	V		
159		Lack of adherence to emergency procedures - control recovery		V				V
160		Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure		V				٧
161		Lack of adherence to SOP for GND movements.	V	٧				
162		Hearback ommitted	٧			V		
163		Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.	V					
164		Aggressive maneuvering / overcontrolling		٧				٧
165		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.		٧			٧	٧
166		Failure to check navigation accuracy before approach			٧			
167		Not recognized ground Navaids System failure not reflected in NOTAM messages			٧			
168		Flaws in manufacturer quality control process - Fire extinguishing system components		٧		V		
169		Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS)			٧			
170		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS)			V			
171		Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS)			V			
172		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence	V					
173		Lack of adherence to the SOP in terms of critical indicators cross-checking			٧			
174		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).			V			
175		Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination			V			
176		Tactical or / and Planning Controller tiredness - Inadequate workload distribution				V		



	Safety Performance	Precursors		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
177		Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology				V		
178		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. Navigational aid failure.			V			
179		Lack of adherence to SOP for AIR operations in terms of controller error in approach clearence instruction			V			
180		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.			V			
181		Inadvertent deviation from cleared taxi route	V					
182		Flaws in Airspace and Air Traffic planning procedures design process				V		
183		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity	V					
184		Inadequate coordination between ATM centers and/or ATC sectors				V		
185		Lack of adherence of airlines to time contraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data.				V		
186		Separation of structural element / component of the aircraft during take-off or landing		V				
187		Lack of adherence to SOP in terms of fuelling procedure		V				
188		Flaws in aircraft system maintenance process definition - Electrical wiring System		V				
189		Flaws in conflict and separation minima infringement detection / elimination procedures				V		
190		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components		٧				
191		Flaws in aircraft system maintenance process definition - Hydraulic System		V				
192		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fuel system components		٧				
193		Inadequate maintenance of fire vulnerable aircraft parts or components		V				
194		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements in terms of fire resistance		V				
195		Lack of adherence to regulations concerning transport of DGR goods		V				
196		Flaws in aircraft system maintenance process definition - Fuel system compoonents		V				
197		Lack of adherence to engine limitations		V				
198		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components		V				
199		Flaws in manufacturer quality control process - Engine systems and / or components		V				
200		Flaws in aircraft system maintenance process definition - Engine systems and / or components		V				
201		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance		V				



	Safety Performance	Descriptions		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
		with requirements - APU systems and / or components						
202		Flaws in manufacturer quality control process - APU systems and / or components		V				
203		Flaws in aircraft system maintenance process definition - APU systems and / or components		V				
204		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Electrical / wiring system components		V				
205		Flaws in manufacturer quality control process - Electrical / wiring systems components		V				
206		Lack of adherence to AFM limitations for Take-off		V			٧	
207		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MTCD System				V		
208		Lack of adherence of airlines to declared Flight Plan.				V		
209		Failure to identify the pre-tactical conflict before it reach the tactical controller				V		
210		Lack of adherence to SOP for Airborne operation in terms of minimum seprataion				V		
211		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum		٧			٧	٧
212		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.				V		
213		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.				V		
214		Flaws in manufacturer quality control process - Communication equipment systems and components.				V		
215		Lack of adherence to SOP for take-off procedure in terms of altimeter callibration.				V		
216		Lack of adherence to Rules of the Air - adherence to Controller clearance				V		
217		Unintuitive and / or error prone system manual - communication equipment.				V		
218		Altitude deviation				V		
219		Level bust (pilot lapse or late re-clearance by ATC)				V		
220		Failure to comply with an altitude or speed restriction / constraint				V		
221		Navigation deviation				V		
222		Incorrect use of communication equipment				V		
223		Military activity in controlled airport or located within controlled area				٧		
224		General aviation activity in controlled airport or located within controlled area				٧		
225		Intensified traffic related to general aviation activity e. g. over GA airport / airfield				٧		
226		Deviation from flight trajectory commanded by controller				٧		



	Safety Performance	Dragingons		Operational issue 1 2 3 4 5				
No.	Indicators	Precursors	1	2	3	4	5	6
227		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components		V				
228		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of fire detection / warning or / and extinguishing system.		V			ļ	
229		Imbalanced and inaproppriate relation between cpt and his subordinates			V			<u> </u>
230		Flaws in aircraft system maintenance process definition - Fire detection system components		V				
231		Flaws in manufacturer quality control process - Fire detection system components		V				
232		Flaws in aircraft system maintenance process definition - Fire warning system		V				
233		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system		V				
234		Flaws in manufacturer quality control process - Fire warning system		V				<u> </u>
235		Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	V					
236		Callsign confusion	V					
237		Takeoff without clearance	V					
238		Landing without clearance	V					
239		Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling					٧	
240		Failure to remember / assess crosswind component limit for prevailing runway condition					V	٧
241		Unintuitive and / or error prone system manual - ground radar.	V					
242		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground Radar	٧					
243		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ground radar at the airport.	V					
244		Lack of adherence to SOP in terms of awareness on supporting systems (warning) - ground radar.	V					
245		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		V				V
246		Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	V					
247		Lack of adherence to SOP in terms of ATCO and approach or ground controller communication	V					
248		High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,)		٧				V
249		Late deceleration and configuration set-up for approach and landing		V				V
250		Unintuitive and / or error prone system manual - CPCS		V			٧	V
251		Descent above desired descent profile		V				V



	Safety Performance	Ducasinosia		Op	eration	al issue	e	
No.	Indicators	Precursors	1	2	3	4	5	6
252		DME / ILS DME confusion in assessing the final descent point / FAF		٧				>
253		Unstabilized final approach (high, fast, steep,)		٧				٧
254		Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications	V					
255		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of STCA System.				V		
256		Lack of adherence to regulations concerning independent ATCO monitoring				V		
257		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - STCA System				V		
258		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components		V				
259		Lack of adherence to AFM in terms of emergency procedures - fire detection and extinguishing procedure		V				
260		Go-around attempt after thrust reversers deployment		V				٧
261		Lack of adherence to AFM limitations for landing		٧				٧
262		Flaws in aircraft system maintenance process definition - Fire extinguishing system components		٧				
263		Lack of adherence to emergency procedures - RWY collision avoidance	V					
264		Lack of adherence to SOP for GND movements. Poor execution of parking / docking /pushback procedure	V					
265		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		٧				٧
266		Inadequate effectivenes of fire extinguishing system		V				
267		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment	V					
268		Late rejected takeoff decision / initiation					٧	
269		Poor application of T/O & RTO procedure, aircraft handling					٧	
270		Unintuitive and / or error prone system manual - fire extinguishing system		٧				
271		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake)	V					
272		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					٧	
273		Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations					٧	
274		Lack of adherence to SOP in terms of load sheet preparation and verification		٧				
275		Lack of adherence to SOP in terms of AFM limitations in terms of weigh and balance		V				
276		Lack of adherence to the current technology standards in terms of flight safety and efficiency - fuel tank allocation.		V				
277		Lack of adherence to SOP in terms of awareness on supporting systems (warning) - RIMCAS.	V					



	Safety Performance	Precursors		Op	eration	al issu	e	
No.	Indicators	PIECUISOIS	1	2	3	4	5	6
278		Flaws in manufacturer quality control process - Landing gear components.		V				
279		Flaws in aircraft system maintenance process definition - Landing gear components.		V				
280		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring						٧
281		Lack of adherence to SOP in terms of pre-flight inspections - cargo securing quality		V				
282		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine fuel distribution system		V				
283		Flaws in manufacturer quality control process - Engine fuel distribution system		V				
284		Flaws in aircraft system maintenance process definition - Engine fuel distribution system		V				<u> </u>
285		Lack of adherence to ICAO Annex 14 and related documents in terms of airside lights distribution	V					
286		Lack of adherence to ICAO Annex 14 and related documents in terms of nonrestricted view on airsite from TWR	V					
287		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of Runway Conflict Warning System.	V					
288		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - RCWS	V					
289		Lack of adherence to AFM in terms of emergency procedures - stall recovery		V				<u> </u>
290		Late activation of pedal braking or takeover from autobrake, when so required		V				V
291		Delayed selection of reverse thrust		V				V
292		Inappropriate selection of autobrake mode for given runway length and condition		V				V
293		Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain)			٧			
294		Premature descent to DA(H) before G/S intercept or premature descent to MDA(H) before final-descent-point / FAF			>			
295		Premature descent below MDA(H) before reaching the visual-descent-point (VDP)			V			
296		Flight below desired flight path during initial and/or final approach			V			
297		Continued approach, when below DA(H) or MDA(H), after loss of visual references			V			
298		Late or inadequate response to MSAW warning			V			
299		Failure to go-around, when so required			V			
300		Failure to follow published missed-approach procedure			٧			
301		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of MSAW system.			٧			
302		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Integrity of primary aircraft structure.		٧				
303		Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.		٧				



	Safety Performance	Duranturant		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
304		Flaws in manufacturer quality control process - Integrity of primary aircraft structure.		٧				
305		Lack of adherence to emergency procedures - flight deck smoke procedure		V				
306		Lack of adherence to the SOP in terms of critical maneuvre execution - flare		V				
307		Extreme operation condition / poor maintenance quality / advanced life lenght		V				
308		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components		٧				
309		Flaws in aircraft system maintenance process definition - Aircraft door system and / or components		V				
310		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MSAW System			٧			
311		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. MSAW warning.			٧			
312		Flaws in manufacturer quality control process - CPCS system and / or components		٧				
313		Flaws in aircraft system maintenance process definition - CPCS system and / or components		V				
314		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - CPCS system and / or components		٧				
315		Incorrect use of automation - CPCS		V				
316		Late thrust reduction or power-on touchdown		V				٧
317		Failure to arm ground-spoilers		V				٧
318		Error in calculation of necessary amount of fuel		V				٧
319		Lack of adherence to SOP in terms of necessary amount of fuel		V				٧
320		Inadequate management / separation of takeoffs and landings	V					
321		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment					V	
322		Poor application of T/O & RTO procedure, braking initiation sequence					V	
323		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.					V	
324		Poor application of T/O & RTO procedure, computation of T/O parameters					٧	
325		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ACAS system components				٧		
326		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS			V			
327		Inappropriate visual avoidance maneuver				٧		
328		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ACAS installed on aircraft.				٧		
329		Late or inadequate response to ACAS warning				V	<u></u> 7	



	Safety Performance	Precursors		V V V V V V V V V V V V V V V V V V V				
No.	Indicators	Precursors	1	2	3	4	5	6
330		Inadequate crosswind landing / decrab technique						V
331		Touchdown off centerline						V
332		Inappropriate use of differential reverse thrust						V
333		Inadequate use of differential braking						V
334		Use of nose wheel steering tiller during rollout						V
335		Flaws in aircraft system maintenance process definition - GPWS system components			>			
336		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - GPWS system components			٧			
337		Flaws in manufacturer quality control process - GPWS system components			٧		<u> </u>	
131	The actual safety impact of each significant airport infrastructural change is evaluated at most after 3 years of implementation of the change	Pilot tiredness - Inadequate workload distribution	V	V	V	V	V	V
132		Flaws in pilot requirements definition process and/or training methodology	V	V	V	V	V	V
133		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	V	٧	٧	٧	V	V
134		Traffic controller tiredness - Inadequate workload distribution	V	V	٧	V	<u> </u>	
135		Flaws in traffic controller requirements definition process and/or training methodology	V	V	V	V		
136		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	V	V	٧		V	V
137		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	V	V	٧		V	V
138		Lack of English proficiency	V	V	٧	V		
139		Lack of adherence to SOP in terms of approach and landing		V	٧		<u> </u>	V
140		Use of non-standard phraseology by pilot and/or controller	V	V	٧	V		
141		Flaws in CRM training procedures		V	٧			V
142		Lack of adherence to the main CRM rules		V	٧			V
143		Incorrect use of automation - FMS		V	V			V
144		Unintuitive and / or error prone system manual - FMS		V	>			V
145		Lack of or poor communication quality	V		٧	V		
146		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	V		>	V		



	Safety Performance	Draguesara		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
147		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.		V	V			V
148		Current airport diagram not reflecting critical changes	V		V		1	
149		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path		٧				V
150		Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather.		V				V
151		Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing		V			<u> </u>	V
152		Incorrect or confusing / misleading ATC instructions	V	V		V		
153		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)			V	V		
154		Altimeter setting error			V	V	<u> </u>	
155		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)			V	V		
156		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)			V	V		
157		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components			V	V		
158		Flaws in manufacturer quality control process - Onboard navigational systems and components.			V	V		
159		Lack of adherence to emergency procedures - control recovery		V				V
160		Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure		V				٧
161		Lack of adherence to SOP for GND movements.	V	V				
162		Hearback ommitted	V			V		
163		Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.	V					
164		Aggressive maneuvering / overcontrolling		V				٧
165		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.		V			٧	٧
166		Failure to check navigation accuracy before approach			V			
167		Not recognized ground Navaids System failure not reflected in NOTAM messages			V			
168		Flaws in manufacturer quality control process - Fire extinguishing system components		V		V		
169		Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS)			V			
170		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS)			V			
171		Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS)			V			
172		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence	V					



	Safety Performance	Precursors		V V V V V V V V V V V V V V V V V V V				
No.	Indicators	Precursors	1	2	3	4	5	6
173		Lack of adherence to the SOP in terms of critical indicators cross-checking			V			
174		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).			V			
175		Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination			V			
176		Tactical or / and Planning Controller tiredness - Inadequate workload distribution				V		
177		Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology				V		
178		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. Navigational aid failure.			V			
179		Lack of adherence to SOP for AIR operations in terms of controller error in approach clearence instruction			V			
180		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.			٧			
181		Inadvertent deviation from cleared taxi route	V					
182		Flaws in Airspace and Air Traffic planning procedures design process				٧		
183		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity	V					
184		Inadequate coordination between ATM centers and/or ATC sectors				V		
185		Lack of adherence of airlines to time contraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data.				٧		
186		Separation of structural element / component of the aircraft during take-off or landing		V				
187		Lack of adherence to SOP in terms of fuelling procedure		V				
188		Flaws in aircraft system maintenance process definition - Electrical wiring System		V				
189		Flaws in conflict and separation minima infringement detection / elimination procedures				V		
190		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components		V				
191		Flaws in aircraft system maintenance process definition - Hydraulic System		V				
192		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fuel system components		V				
193		Inadequate maintenance of fire vulnerable aircraft parts or components		V				
194		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements in terms of fire resistance		٧				
195		Lack of adherence to regulations concerning transport of DGR goods		V				
196		Flaws in aircraft system maintenance process definition - Fuel system compoonents		V				



	Safety Performance	Ducasinosus		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
197		Lack of adherence to engine limitations		V				
198		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components		V				
199		Flaws in manufacturer quality control process - Engine systems and / or components		V				
200		Flaws in aircraft system maintenance process definition - Engine systems and / or components		V				
201		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components		V				
202		Flaws in manufacturer quality control process - APU systems and / or components		V				<u> </u>
203		Flaws in aircraft system maintenance process definition - APU systems and / or components		V				
204		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Electrical / wiring system components		V				
205		Flaws in manufacturer quality control process - Electrical / wiring systems components		V				<u> </u>
206		Lack of adherence to AFM limitations for Take-off		V			٧	
207		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MTCD System				٧		
208		Lack of adherence of airlines to declared Flight Plan.				V		
209		Failure to identify the pre-tactical conflict before it reach the tactical controller				V		
210		Lack of adherence to SOP for Airborne operation in terms of minimum seprataion				V		
211		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum		V			V	V
212		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.				V		
213		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.				V		
214		Flaws in manufacturer quality control process - Communication equipment systems and components.				V		
215		Lack of adherence to SOP for take-off procedure in terms of altimeter callibration.				V		
216		Lack of adherence to Rules of the Air - adherence to Controller clearance				V		
217		Unintuitive and / or error prone system manual - communication equipment.				V		
218		Altitude deviation				V		
219		Level bust (pilot lapse or late re-clearance by ATC)				V		
220		Failure to comply with an altitude or speed restriction / constraint				٧		
221		Navigation deviation				V		



	Safety Performance	Precursors		Ор	Operational issue			
No.	Indicators	Precursors	1	2	3	4	5	6
222		Incorrect use of communication equipment				V		
223		Military activity in controlled airport or located within controlled area				V		
224		General aviation activity in controlled airport or located within controlled area				V		
225		Intensified traffic related to general aviation activity e. g. over GA airport / airfield				V		
226		Deviation from flight trajectory commanded by controller				V		
227		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components		V				
228		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of fire detection / warning or / and extinguishing system.		V				
229		Imbalanced and inaproppriate relation between cpt and his subordinates			V			
230		Flaws in aircraft system maintenance process definition - Fire detection system components		٧				
231		Flaws in manufacturer quality control process - Fire detection system components		V				
232		Flaws in aircraft system maintenance process definition - Fire warning system		V				
233		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system		V				
234		Flaws in manufacturer quality control process - Fire warning system		V				
235		Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	V					
236		Callsign confusion	V					
237		Takeoff without clearance	V					
238		Landing without clearance	V					
239		Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling					٧	
240		Failure to remember / assess crosswind component limit for prevailing runway condition					٧	V
241		Unintuitive and / or error prone system manual - ground radar.	V					
242		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground Radar	V					
243		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ground radar at the airport.	V					
244		Lack of adherence to SOP in terms of awareness on supporting systems (warning) - ground radar.	V					
245		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		V				V
246		Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	V					



	Safety Performance	Ducasiyaaya		Op	Operational issue			
No.	Indicators	Precursors	1	2	3	4	5	6
247		Lack of adherence to SOP in terms of ATCO and approach or ground controller communication	V				<u> </u>	
248		High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,)		V				V
249		Late deceleration and configuration set-up for approach and landing		V				V
250		Unintuitive and / or error prone system manual - CPCS		V			V	V
251		Descent above desired descent profile		V			<u> </u>	V
252		DME / ILS DME confusion in assessing the final descent point / FAF		V			<u> </u>	٧
253		Unstabilized final approach (high, fast, steep,)		V			1	V
254		Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications	V					
255		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of STCA System.				V	<u> </u>	
256		Lack of adherence to regulations concerning independent ATCO monitoring				V	<u> </u>	
257		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - STCA System				٧		
258		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components		V				
259		Lack of adherence to AFM in terms of emergency procedures - fire detection and extinguishing procedure		V			<u> </u>	
260		Go-around attempt after thrust reversers deployment		V			<u> </u>	٧
261		Lack of adherence to AFM limitations for landing		V			1	٧
262		Flaws in aircraft system maintenance process definition - Fire extinguishing system components		V				
263		Lack of adherence to emergency procedures - RWY collision avoidance	V				1	
264		Lack of adherence to SOP for GND movements. Poor execution of parking / docking /pushback procedure	V				1	
265		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		V				٧
266		Inadequate effectivenes of fire extinguishing system		V				
267		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment	V					
268		Late rejected takeoff decision / initiation					V	
269		Poor application of T/O & RTO procedure, aircraft handling					V	
270		Unintuitive and / or error prone system manual - fire extinguishing system		٧				
271		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake)	V					



	Safety Performance	Dura susuana		Ор				
No.	Indicators	Precursors	1	2	3	4	5	6
272		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					٧	
273		Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations					٧	
274		Lack of adherence to SOP in terms of load sheet preparation and verification		V				
275		Lack of adherence to SOP in terms of AFM limitations in terms of weigh and balance		V				
276		Lack of adherence to the current technology standards in terms of flight safety and efficiency - fuel tank allocation.		V				
277		Lack of adherence to SOP in terms of awareness on supporting systems (warning) - RIMCAS.	V					
278		Flaws in manufacturer quality control process - Landing gear components.		V				
279		Flaws in aircraft system maintenance process definition - Landing gear components.		V				
280		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring						٧
281		Lack of adherence to SOP in terms of pre-flight inspections - cargo securing quality		V				
282		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine fuel distribution system		V				
283		Flaws in manufacturer quality control process - Engine fuel distribution system		V				
284		Flaws in aircraft system maintenance process definition - Engine fuel distribution system		V				
285		Lack of adherence to ICAO Annex 14 and related documents in terms of airside lights distribution	V					
286		Lack of adherence to ICAO Annex 14 and related documents in terms of nonrestricted view on airsite from TWR	V					
287		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of Runway Conflict Warning System.	V					
288		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - RCWS	٧					
289		Lack of adherence to AFM in terms of emergency procedures - stall recovery		V				
290		Late activation of pedal braking or takeover from autobrake, when so required		V				٧
291		Delayed selection of reverse thrust		V				٧
292		Inappropriate selection of autobrake mode for given runway length and condition		V				٧
293		Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain)			V			
294		Premature descent to DA(H) before G/S intercept or premature descent to MDA(H) before final-descent-point / FAF			V			
295		Premature descent below MDA(H) before reaching the visual-descent-point (VDP)			V			
296		Flight below desired flight path during initial and/or final approach			V			
297		Continued approach, when below DA(H) or MDA(H), after loss of visual references			V			
298		Late or inadequate response to MSAW warning			V			



	Safety Performance	Precursors		Op				
No.	Indicators	Precursors	1	2	3	4	5	6
299		Failure to go-around, when so required			V			
300		Failure to follow published missed-approach procedure			V			
301		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of MSAW system.			V			
302		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Integrity of primary aircraft structure.		V				
303		Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.		V				
304		Flaws in manufacturer quality control process - Integrity of primary aircraft structure.		V				
305		Lack of adherence to emergency procedures - flight deck smoke procedure		V				
306		Lack of adherence to the SOP in terms of critical maneuvre execution - flare		V				
307		Extreme operation condition / poor maintenance quality / advanced life lenght		V				
308		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components		٧				
309		Flaws in aircraft system maintenance process definition - Aircraft door system and / or components		V				
310		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MSAW System			V			
311		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. MSAW warning.			V			
312		Flaws in manufacturer quality control process - CPCS system and / or components		V				
313		Flaws in aircraft system maintenance process definition - CPCS system and / or components		٧	1			
314		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - CPCS system and / or components		٧				
315		Incorrect use of automation - CPCS		V				l
316		Late thrust reduction or power-on touchdown		V	1			٧
317		Failure to arm ground-spoilers		V				٧
318		Error in calculation of necessary amount of fuel		V	1			٧
319		Lack of adherence to SOP in terms of necessary amount of fuel		V				٧
320		Inadequate management / separation of takeoffs and landings	V					
321		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment					V	
322		Poor application of T/O & RTO procedure, braking initiation sequence					V	
323		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.					V	
324		Poor application of T/O & RTO procedure, computation of T/O parameters					V	-



	Safety Performance	Dracureare		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
325		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ACAS system components				V		
326		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS			V			
327		Inappropriate visual avoidance maneuver				V		
328		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ACAS installed on aircraft.				V		
329		Late or inadequate response to ACAS warning				V		
330		Inadequate crosswind landing / decrab technique						٧
331		Touchdown off centerline						٧
332		Inappropriate use of differential reverse thrust						٧
333		Inadequate use of differential braking						٧
334		Use of nose wheel steering tiller during rollout						٧
335		Flaws in aircraft system maintenance process definition - GPWS system components			V			
336		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - GPWS system components			V			
337		Flaws in manufacturer quality control process - GPWS system components			V			1
131	The safety impact of each significant aircraft modification is assessed and deemed acceptable before the actual introduction of the modification	Pilot tiredness - Inadequate workload distribution	V	V	V	V	٧	V
132		Flaws in pilot requirements definition process and/or training methodology	V	V	V	V	٧	٧
133		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	V	٧	V	V	٧	٧
134		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	V	V	V	٧	٧	٧
135		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	V	٧	V	٧	V	V
136		Traffic controller tiredness - Inadequate workload distribution	V	٧	V	V	٧	V
137		Flaws in traffic controller requirements definition process and/or training methodology	V	V	V	V	٧	٧
138		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		V			V	V



	Safety Performance	Precursors		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
139		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.		V			٧	٧
140		Lack of adherence to SOP in terms of approach and landing		٧	٧		1	V
141		Unintuitive and / or error prone system manual - CPCS		٧			V	V
142		Lack of adherence to the SOP in terms of critical indicators cross-checking		V	٧		<u> </u>	
143		Flaws in CRM training procedures		V	٧		٧	V
144		Lack of adherence to the main CRM rules		V	٧		V	V
145		Incorrect use of automation - FMS		V	٧		<u> </u>	V
146		Unintuitive and / or error prone system manual - FMS		V	>			V
147		Lack of or poor communication quality	V		٧	V	٧	
148		Aggressive maneuvering / overcontrolling		V				V
149		Lack of English proficiency	V	V	٧	V	٧	
150		Use of non-standard phraseology by pilot and/or controller	V	V	V	V	٧	
151		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring		٧			٧	V
152		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	V		٧	V	٧	
153		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		V			٧	V
154		Inadequate aircraft de-icing / anti-icing		٧			V	
155		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components		V			V	
156		Flaws in manufacturer quality control process - Engine systems and / or components		V			V	
157		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)		٧	>	V	٧	
158		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).		٧	>			٧
159		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)		V	V	V	V	
160		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fuel system components		V				
161		Flaws in aircraft system maintenance process definition - Fuel system compoonents		٧			1	
162		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)		V	V	٧	V	
163		Lack of adherence to SOP in terms of de-icing / anti-icing procedures.		V			٧	
164		Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing		٧				V



	Safety Performance	Descriptions		Operational issue				
No.	Indicators	Precursors	1	2	3	4	5	6
165		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.		V	V			V
166		Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather.		V				V
167		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components			V	V	V	
168		Flaws in manufacturer quality control process - Onboard navigational systems and components.			V	V	V	
169		Incorrect or confusing / misleading ATC instructions	V	V		V	٧	
170		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Integrity of primary aircraft structure.		V				
171		Flaws in manufacturer quality control process - Integrity of primary aircraft structure.		V				
172		Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.		V				
173		Lack of adherence to emergency procedures - control recovery		V				V
174		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path		V				٧
175		Current airport diagram not reflecting critical changes	V		V			
176		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.		V			V	
177		Flaws in aircraft system maintenance process definition - Components of Wing control surface system.		V			V	
178		Flaws in manufacturer quality control process - Components of Wing control surface system.		V			V	
179		Lack of adherence to SARPs in terms of avoiding adverse weather conditions during flight		V				
180		Altimeter setting error			V	V		
181		Lack of adherence to SOP in terms of AFM limitations		٧				
182		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					V	
183		Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure		V				V
184		Flaws in aircraft system maintenance process definition - Landing gear components.		٧				
185		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components		V			V	
186		Flaws in aircraft system maintenance process definition - APU systems and / or components		V			V	
187		Flaws in manufacturer quality control process - Fuel system components.		٧				
188		Flaws in manufacturer quality control process - Landing gear components.		٧				
189		Flaws in aircraft system maintenance process definition - Engine systems and / or components		V			V	



	Safety Performance	Drocurrors		Ор	erationa	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
190		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine anti-ice systems and / or components		V				
191		Flaws in manufacturer quality control process - Engine anti-ice system and / or components		V				
192		Flaws in aircraft system maintenance process definition - Engine anti-ice system and / or components		V				
193		Incorrect use of automation -Engine anti-ice system		V				l
194		Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination		V	٧			
195		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Reduction gear in the engine		V				
196		Flaws in manufacturer quality control process - Reduction gear in the engine.		V				l
197		Flaws in aircraft system maintenance process definition - Reduction gear in the engine.		V				
198		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.			V	V	V	
199		Inadequate de-icing method applied		V	ļ			ł
200		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Compressor in the engine		V				
201		Flaws in manufacturer quality control process - Compressor in the engine.		V				
202		Flaws in aircraft system maintenance process definition - Compressor in the engine.		V				
203		Flaws in manufacturer quality control process - Engine accessory drive components.		V				
204		Flaws in aircraft system maintenance process definition - Engine accessory drive components.		٧				1
205		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine accessory drive components.		V				
206		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ECAM (or similar) system components.		V				
207		Lack of adherence to emergency procedures - Fuel starvation		V				1
208		Flaws in aircraft system maintenance process definition - Oil distribution system		V				
209		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Oil distribution system		V				
210		Flaws in manufacturer quality control process - Oil distribution system		V				
211		Flaws in manufacturer quality control process - Fire extinguishing system components		٧		V	٧	
212		Flaws in aircraft system maintenance process definition - ECAM (or similar) system components.		٧				
213		Unintuitive and / or error prone system manual - Engine anti-icing system		V				1



	Safety Performance	Precursors		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
214		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ECAM.		V				
215		Flaws in manufacturer quality control process - ECAM (or similar) system components.		V				
216		Flaws in manufacturer quality control process - APU systems and / or components		٧			V	
217		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence	V				٧	
218		Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.	V				٧	
219		Flaws in aircraft system maintenance process definition - Engine combustor		V				
220		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine combustor		V				
221		Flaws in manufacturer quality control process - Engine combustor		V				
222		Flaws in aircraft system maintenance process definition - Engine turbine components		V				
223		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine turbine components		٧				
224		Flaws in manufacturer quality control process - Engine turbine components		V				
225		Hearback ommitted	V			V		
226		Flaws in aircraft system maintenance process definition - Electrical wiring System		٧			V	
227		Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.					٧	
228		Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.					٧	
229		Incorrect stab-trim setting					V	
230		Lack of adherence to Rules of the Air - adherence to Controller clearance				V	٧	
231		Lack of adherence to SOP for GND movements.	V	٧				
232		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity	٧				٧	
233		Failure to check navigation accuracy before approach			V			
234		High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,)		٧				٧
235		Late deceleration and configuration set-up for approach and landing		V				V
236		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. Navigational aid failure.			٧			
237		Not recognized ground Navaids System failure not reflected in NOTAM messages			٧			
238		Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS)			V			
239		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance			V			



	Safety Performance	Precursors		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
		with requirements - Ground navigational systems and components (e.g. ILS)						
240		Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS)			V			
241		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.				V	٧	
242		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.				V	٧	
243		Flaws in manufacturer quality control process - Communication equipment systems and components.				V	V	
244		Lack of adherence to SOP for AIR operations in terms of controller error in approach clearence instruction			V			
245		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components		٧			٧	
246		Flaws in aircraft system maintenance process definition - Hydraulic System		V			٧	
247		Poor application of T/O & RTO procedure, aircraft handling					٧	
248		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum		٧			V	٧
249		Navigation deviation				V	٧	
250		Flaws in Airspace and Air Traffic planning procedures design process				V	٧	
251		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components		V			٧	
252		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake)	٧				٧	
253		Poor application of T/O & RTO procedure, failure recognition and preparedness					٧	
254		Flaws in aircraft system maintenance process definition - Fire detection system components		V			٧	
255		Flaws in manufacturer quality control process - Fire detection system components		V			٧	
256		Flaws in aircraft system maintenance process definition - Fire warning system		V			٧	
257		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system		V			V	
258		Flaws in manufacturer quality control process - Fire warning system		V			٧	
259		Lack of adherence to AFM limitations for Take-off		٧			٧	
260		Unstabilized final approach (high, fast, steep,)		٧				V
261		Inadvertent deviation from cleared taxi route	V					
262		Difference indications of independent aircraft speed / altitude or attitude indicators		V				
263		Takeoff without clearance	V				٧	



	Safety Performance	Duanisana		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
264		Landing without clearance	V				V	
265		Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	V				٧	
266		Unintuitive and / or error prone system manual - FMC					V	
267		Undetected incorrect takeoff configuration					V	
268		Unintuitive and / or error prone system manual - communication equipment.				V		
269		Incorrect use of communication equipment				V		
270		Lack of adherence to regulations concerning transport of DGR goods		V				
271		Separation of structural element / component of the aircraft during take-off or landing		V				
272		Failure to remember / assess crosswind component limit for prevailing runway condition					٧	V
273		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Electrical / wiring system components		V				
274		Flaws in manufacturer quality control process - Electrical / wiring systems components		V				
275		Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	V				٧	
276		Lack of adherence to SOP in terms of fuelling procedure		V				
277		Inadequate maintenance of fire vulnerable aircraft parts or components		V				
278		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements in terms of fire resistance		٧				
279		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Anti-icing system components		V				
280		Lack of adherence to engine limitations		V				
281		Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications	V				٧	
282		Lack of adherence to SOP for take-off procedure in terms of altimeter callibration.				V		
283		Excessive pitch attitude		V				
284		Excessive bank angle		V				
285		Tactical or / and Planning Controller tiredness - Inadequate workload distribution				V		
286		Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology				V		
287		Altitude deviation				V		
288		Level bust (pilot lapse or late re-clearance by ATC)				V		
289		Failure to comply with an altitude or speed restriction / constraint				V		



	Safety Performance	Ducasiyaaya		Operational issue				
No.	Indicators	Precursors	1	2	3	4	5	6
290		Inadequate coordination between ATM centers and/or ATC sectors				V		
291		Flaws in conflict and separation minima infringement detection / elimination procedures				٧		
292		Lack of adherence of airlines to time contraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data.				٧		
293		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MTCD System				>		
294		Lack of adherence of airlines to declared Flight Plan.				V		
295		Failure to identify the pre-tactical conflict before it reach the tactical controller				V		
296		Lack of adherence to SOP for Airborne operation in terms of minimum seprataion				V		
297		Military activity in controlled airport or located within controlled area				V		
298		General aviation activity in controlled airport or located within controlled area				V		
299		Intensified traffic related to general aviation activity e. g. over GA airport / airfield				V		
300		Deviation from flight trajectory commanded by controller				V		
301		Flaws in manufacturer quality control process - Anti-icing system components		٧				
302		Flaws in aircraft system maintenance process definition - Anti-icing systems components		٧				
303		DME / ILS DME confusion in assessing the final descent point / FAF		٧				٧
304		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components		٧			V	
305		Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling		٧			V	
306		Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared		٧				٧
307		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System.		٧				٧
308		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of fire detection / warning or / and extinguishing system.		٧				
309		Flaws in manufacturer quality control process - Power supply system components		٧			V	
310		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system		٧				V
311		Lack of adherence to AFM in terms of emergency procedures - stall recovery		V			٧	
312		Flaws in manufacturer quality control process - PWS system components		٧				٧
313		Imbalanced and inaproppriate relation between cpt and his subordinates			V		_	
314		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.		٧				٧
315		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance		٧				٧



	Safety Performance	Duanimanua		Operational issue				
No.	Indicators	Precursors	1	2	3	4	5	6
		with requirements - LLWAS system						
316		Flaws in aircraft system maintenance process definition - Fire extinguishing system components		V			٧	
317		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components					V	
318		Lack of adherence to SOP in terms of aircraft icing (condition) monitoring		V			٧	
319		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FCS system or components		V			V	
320		Flaws in manufacturer quality control process - FCS system components		V			٧	
321		Flaws in aircraft system maintenance process definition - FCS systems or components		V			٧	
322		Unintuitive and / or error prone system manual - ground radar.	V				٧	
323		Late rejected takeoff decision / initiation					٧	
324		Descent above desired descent profile		V				V
325		Callsign confusion	V					
326		Lack of adherence to SOP in terms of ATCO and approach or ground controller communication	V					
327		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground Radar	V					
328		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ground radar at the airport.	V					
329		Lack of adherence to SOP in terms of awareness on supporting systems (warning) - ground radar.	V					
330		Lack of adherence to AFM limitations for landing		V				V
331		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine		٧			V	
332		Flaws in manufacturer quality control process - Autothrottle system in the engine.		V			٧	
333		Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.		V			٧	
334		Lack of adherence to AFM in terms of emergency procedures - engine restart procedure		V				
335		Lack of adherence to SOP in terms of awareness on supporting systems warning		V				
336		Unintuitive and / or error prone system manual - ECAM		V				
337		Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations					V	
338		Tailwind component above limit						V
339		Flaws in manufacturer quality control process - Engine sensors		V				
340		Flaws in aircraft system maintenance process definition - Engine sensors		V				



	Safety Performance	Precursors		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
341		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine sensors		V				
342		Lack of adherence to emergency procedures - WEM		V				V
343		Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.		V			V	
344		Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT)		V			٧	
345		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - antiice fluid HOT		V			V	
346		Lack of adherence to SOP in terms of safety best practices		V				
347		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of STCA System.				V		
348		Lack of adherence to regulations concerning independent ATCO monitoring				V		
349		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - STCA System				V		
350		Lack of adherence to AFM in terms of emergency procedures - fire detection and extinguishing procedure		V				
351		Lack of adherence to SOP for GND movements. Poor execution of parking / docking /pushback procedure	V					
352		Go-around attempt after thrust reversers deployment		٧				V
353		Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing		V			٧	
354		Flaws in aircraft system maintenance process definition - ADI system components		V				
355		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ADI system components		V				
356		Flaws in manufacturer quality control process - ADI system components		V				
357		Slow rotation (i.e., low pitch rate)					٧	
358		Lack of adherence to emergency procedures - RWY collision avoidance	V					
359		Incorrect use of automation - TOCW System					٧	
360		Flaws in aircraft system maintenance process definition - TOCW System					٧	
361		Unintuitive and / or error prone system manual - TOCW					٧	
362		Inadequate effectivenes of fire extinguishing system		V				
363		Lack of adherence to the SOP in terms of critical maneuvre execution		V				
364		Applied de-icing / anti-icing method is not sufficient for predicted conditions		V			٧	
365		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System					٧	
366		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance	V					



	Safety Performance	Ducassuración		Ор	eration	al issu	<u> </u>	
No.	Indicators	Precursors	1	2	3	4	5	6
		with requirements - Ground equipment						
367		Incorrect use of automation - Anti-icing system		V				
368		Unintuitive and / or error prone system manual - Anti-icing system		V				
369		Lack of adherence to SOP in terms of pre-flight inspections -presence of anti-contamination covers on pitot static tube		V				
370		Lack of adherence to SOP in terms of briefing and checklist before initiating of start of taxiing and take-off		V				
371		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Pitot static system components		V				
372		Flaws in manufacturer quality control process - Pitot static system components		V				
373		Flaws in aircraft system maintenance process definition - Pitot static systems components		V			<u> </u>	
374		Lack of adherence to SOP for take-off procedure in terms of speed bug checklist preparation and verification.					٧	
375		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ADI		V				
376		Flaws in manufacturer quality control process - ADI		V				
377		Flaws in aircraft system maintenance process definition - ADI		V				
378		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ASI		V				
379		Flaws in manufacturer quality control process - ASI		V				
380		Flaws in aircraft system maintenance process definition - ASI		٧				
381		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PFD		V				
382		Flaws in manufacturer quality control process - PFD		V				
383		Flaws in aircraft system maintenance process definition - PFD		V				
384		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine fuel distribution system		٧				
385		Flaws in manufacturer quality control process - Engine fuel distribution system		V				
386		Flaws in aircraft system maintenance process definition - Engine fuel distribution system		V				
387		Unintuitive and / or error prone system manual - fire extinguishing system		٧				
388		Late activation of pedal braking or takeover from autobrake, when so required		٧				٧
389		Delayed selection of reverse thrust		٧				٧
390		Inappropriate selection of autobrake mode for given runway length and condition		٧				٧
391		Poor application of T/O & RTO procedure, braking initiation sequence					V	



	Safety Performance	Precursors		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
392		Lack of adherence to SOP in terms of requested information support for other aircraft in terms of adverse weather conditions		V				
393		Lack of adherence to SOP in terms of application of findings from weather report		V				
394		Lack of adherence to SOP in terms of AFM limitations in terms of weigh and balance		V				
395		Flaws in aircraft system maintenance process definition - stickshaker		V			٧	
396		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - stickshaker system components		V			V	
397		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment					V	
398		Flight below maneuvering speeds		V				
399		Lack of adherence to SOP in terms of awareness on supporting systems warning - stickshaker		٧			>	
400		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.					٧	
401		Incorrect weather report obtained by the flight crew		V				
402		Lack of adherence of passengers to the recommendation: Fasten seat belt while seated		V				
403		Lack of adherence to SOP in terms of "fasten your seat belt" information activation in passenger cabin during flight in turbulence conditions		V				
404		Lack of adherence to SOP in terms of load sheet preparation and verification		V				
405		Lack of adherence to the current technology standards in terms of flight safety and efficiency - fuel tank allocation.		V				
406		Lack of adherence to emergency procedures - recovery from severe FCS failure		V				
407		Flaws in airport capacity management process					>	
408		Unintuitive and / or error prone system manual - On-board weather radar.		V				
409		Incorrect use of automation - On-board weather radar		V				
410		Inadequate airline / regulatory provider policy in terms of aware of the risks related to air travel		V				
411		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - On-board weather radar		V				
412		Flaws in manufacturer quality control process - On-board weather radar		V				
413		Flaws in aircraft system maintenance process definition - On-board weather radar		V				
414		Lack of adherence to SOP in terms of providing flight crew with current weather report		٧				
415		Poor application of T/O & RTO procedure, computation of T/O parameters					٧	
416		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Rudder components.		V				
417		Flaws in aircraft system maintenance process definition - Rudder components.		V				



	Safety Performance	Duanimanua		Operational issue				
No.	Indicators	Precursors	1	2	3	4	5	6
418		Flaws in manufacturer quality control process - Rudder components.		V				
419		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Horizontal stabilizer components.		V				
420		Flaws in aircraft system maintenance process definition - Horizontal stabilizer components.		V				
421		Flaws in manufacturer quality control process - Horizontal stabilizer components.		V				
422		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Thrust reverse system in the engine.		V				
423		Flaws in manufacturer quality control process - Thrust reverse system in the engine.		V				
424		Flaws in aircraft system maintenance process definition - Thrust reverse system in the engine.		V				
425		Lack of adherence to SOP for take-off procedure in terms of time limitation for take-off preparation.					٧	
426		Inadequate crosswind landing / decrab technique						٧
427		Touchdown off centerline						٧
428		Inappropriate use of differential reverse thrust						٧
429		Lack of adherence to SOP in terms of pre-flight inspections - cargo securing quality		٧				
430		Inadequate use of differential braking						٧
431		Use of nose wheel steering tiller during rollout						٧
432		Lack of adherence to SOP in terms of awareness on supporting systems (warning) - RIMCAS.	V					
433		Error in calculation of necessary amount of fuel		V				٧
434		Lack of adherence to SOP in terms of pre-flight inspections - ice presence on aircraft		٧				
435		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components		٧				
436		Flaws in aircraft system maintenance process definition - Aircraft door system and / or components		V				<u> </u>
437		Long / floating flare						V
438		Lack of adherence to ICAO Annex 14 and related documents in terms of airside lights distribution	V					1
439		Lack of adherence to ICAO Annex 14 and related documents in terms of nonrestricted view on airsite from TWR	V					1
440		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of Runway Conflict Warning System.	V					
441		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - RCWS	V					
442		Lack of adherence to TO procedure in terms of antiice protection		٧				
443		Flaws in manufacturer quality control process - anti-ice fluid specifications (HOT)		٧				_



	Safety Performance	D		Op	eration	e		
No.	Indicators	Precursors	1	2	3	4	5	6
444		Lack of adherence to the SOP in terms of critical maneuvre execution - flare		٧				
445		Extreme operation condition / poor maintenance quality / advanced life lenght		٧				
446		Failure to arm ground-spoilers		V				٧
447		Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain)			V			
448		Premature descent to DA(H) before G/S intercept or premature descent to MDA(H) before final-descent-point / FAF			V			
449		Premature descent below MDA(H) before reaching the visual-descent-point (VDP)			V			
450		Flight below desired flight path during initial and/or final approach			>			
451		Continued approach, when below DA(H) or MDA(H), after loss of visual references			V			
452		Late or inadequate response to MSAW warning			V			
453		Failure to go-around, when so required			V			
454		Failure to follow published missed-approach procedure			V			
455		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of MSAW system.			V			
456		Lack of adherence to emergency procedures - flight deck smoke procedure		٧				
457		Lack of adherence to AFM in terms of emergency procedures - windshear recovery		٧				
458		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MSAW System			٧			
459		Lack of adherence to the current technology standards in terms of flight safety and efficiency - engines location.		V				
460		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. MSAW warning.			V			
461		Flaws in manufacturer quality control process - CPCS system and / or components		٧				
462		Flaws in aircraft system maintenance process definition - CPCS system and / or components		V				
463		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - CPCS system and / or components		٧				
464		Incorrect use of automation - CPCS		V				
465		Inadequate stall recovery procedure for the aircraft	V				٧	
466		Late thrust reduction or power-on touchdown		V				V
467		Use of non-standard phraseology by pilot flying (PF) and/or pilot not flying (PNF)		V				
468		Lack of adherence to SOP in terms of necessary amount of fuel		٧				٧
469		Flaws in manufacturer quality control process - Stickshaker system components		٧			٧	
470		Lack of adherence to AFM in terms of emergency procedures - engine failure		V				



	Safety Performance	Precursors						
No.	Indicators	Pietuisois	1	2	3	4	5	6
471		Inadequate management / separation of takeoffs and landings	V					
472		Flaws in manufacturer quality control process - TOCW system components					٧	
473		Lack of adherence to SOP for approach and landing		V				
474		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment		V				
475		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ACAS system components				V		
476		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS			٧			
477		Inappropriate visual avoidance maneuver				V		
478		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ACAS installed on aircraft.				V		
479		Late or inadequate response to ACAS warning				V	<u> </u>	
480		Taxiing without clearance		V				
481		Flaws in aircraft system maintenance process definition - GPWS system components			V		<u> </u>	
482		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - GPWS system components			٧			
483		Flaws in manufacturer quality control process - GPWS system components			V			
131	The actual safety impact of each significant aircraft modification is evaluated at most after 3 years of implementation of the modification	Pilot tiredness - Inadequate workload distribution	V	V	V	V	٧	V
132		Flaws in pilot requirements definition process and/or training methodology	V	V	V	V	V	V
133		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	٧	٧	V	٧	٧	٧
134		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	V	V	V	V	V	V
135		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	٧	٧	٧	٧	V	٧
136		Traffic controller tiredness - Inadequate workload distribution	V	V	V	V	V	V
137		Flaws in traffic controller requirements definition process and/or training methodology	V	V	V	V	V	V
138		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		٧			V	٧
139		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.		V			V	V



	Safety Performance	Duranteen		Op	eration			
No.	Indicators	Precursors	1	2	3	4	5	6
140		Lack of adherence to SOP in terms of approach and landing		V	V			٧
141		Unintuitive and / or error prone system manual - CPCS		V			V	٧
142		Lack of adherence to the SOP in terms of critical indicators cross-checking		V	V			
143		Flaws in CRM training procedures		V	V		٧	٧
144		Lack of adherence to the main CRM rules		V	V		٧	٧
145		Incorrect use of automation - FMS		V	V			٧
146		Unintuitive and / or error prone system manual - FMS		V	V			٧
147		Lack of or poor communication quality	V		V	V	٧	
148		Aggressive maneuvering / overcontrolling		V				٧
149		Lack of English proficiency	V	V	V	V	V	
150		Use of non-standard phraseology by pilot and/or controller	V	V	V	V	V	
151		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring		٧			V	٧
152		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	V		V	V	V	
153		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		V			V	٧
154		Inadequate aircraft de-icing / anti-icing		V			٧	
155		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components		V			V	
156		Flaws in manufacturer quality control process - Engine systems and / or components		V			V	
157		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)		V	V	V	V	
158		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).		V	V			V
159		Flaws in aircraft system maintenance process definition - Fuel system compoonents		V				
160		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fuel system components		٧				
161		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)		٧	V	V	٧	
162		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)		٧	V	V	٧	
163		Lack of adherence to SOP in terms of de-icing / anti-icing procedures.		V			V	
164		Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing		V				٧
165		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.		V	V			V



	Safety Performance	Ducasiyaaya		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
166		Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather.		V				V
167		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components			V	V	٧	
168		Flaws in manufacturer quality control process - Onboard navigational systems and components.			V	V	V	
169		Incorrect or confusing / misleading ATC instructions	V	V		V	V	1
170		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Integrity of primary aircraft structure.		V				
171		Flaws in manufacturer quality control process - Integrity of primary aircraft structure.		V				
172		Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.		V				
173		Lack of adherence to emergency procedures - control recovery		V				V
174		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path		V				V
175		Current airport diagram not reflecting critical changes	V		V		i n	1
176		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.		٧			V	
177		Flaws in aircraft system maintenance process definition - Components of Wing control surface system.		V			٧	
178		Flaws in manufacturer quality control process - Components of Wing control surface system.		V			٧	
179		Lack of adherence to SARPs in terms of avoiding adverse weather conditions during flight		V				
180		Altimeter setting error			V	V		
181		Lack of adherence to SOP in terms of AFM limitations		V				
182		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					٧	
183		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components		V			٧	
184		Flaws in aircraft system maintenance process definition - APU systems and / or components		V			٧	
185		Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure		V				٧
186		Flaws in aircraft system maintenance process definition - Landing gear components.		V				
187		Flaws in manufacturer quality control process - Fuel system components.		V				
188		Flaws in manufacturer quality control process - Landing gear components.		٧				
189		Flaws in aircraft system maintenance process definition - Engine systems and / or components		٧			٧	
190		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine anti-ice systems and / or components		٧				



	Safety Performance	Precursors		Ор	eration			
No.	Indicators	Precursors	1	2	3	4	5	6
191		Flaws in manufacturer quality control process - Engine anti-ice system and / or components		V				
192		Flaws in aircraft system maintenance process definition - Engine anti-ice system and / or components		V				
193		Incorrect use of automation -Engine anti-ice system		V				
194		Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination		V	V			
195		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Reduction gear in the engine		V				
196		Flaws in manufacturer quality control process - Reduction gear in the engine.		V				
197		Flaws in aircraft system maintenance process definition - Reduction gear in the engine.		V				Ì
198		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.			>	V	٧	
199		Inadequate de-icing method applied		٧				Ì
200		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Compressor in the engine		V				
201		Flaws in manufacturer quality control process - Compressor in the engine.		V				
202		Flaws in aircraft system maintenance process definition - Compressor in the engine.		V				
203		Flaws in manufacturer quality control process - Engine accessory drive components.		V				
204		Flaws in aircraft system maintenance process definition - Engine accessory drive components.		V				
205		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine accessory drive components.		٧				
206		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ECAM (or similar) system components.		٧				
207		Lack of adherence to emergency procedures - Fuel starvation		V				
208		Flaws in aircraft system maintenance process definition - Oil distribution system		V				
209		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Oil distribution system		V				
210		Flaws in manufacturer quality control process - Oil distribution system		V				
211		Flaws in manufacturer quality control process - APU systems and / or components		٧			٧	
212		Flaws in manufacturer quality control process - Fire extinguishing system components		٧		٧	٧	
213		Flaws in aircraft system maintenance process definition - ECAM (or similar) system components.		٧				
214		Unintuitive and / or error prone system manual - Engine anti-icing system		٧				
215		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ECAM.		٧				



	Safety Performance	Ducasinosus		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
216		Flaws in manufacturer quality control process - ECAM (or similar) system components.		V				
217		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence	V				٧	
218		Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.	V				٧	
219		Flaws in aircraft system maintenance process definition - Electrical wiring System		V			٧	
220		Flaws in aircraft system maintenance process definition - Engine combustor		V				
221		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine combustor		٧				
222		Flaws in manufacturer quality control process - Engine combustor		V				
223		Flaws in aircraft system maintenance process definition - Engine turbine components		V				
224		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine turbine components		V				
225		Flaws in manufacturer quality control process - Engine turbine components		V				
226		Hearback ommitted	V			V		
227		Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.					٧	
228		Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.					٧	
229		Incorrect stab-trim setting					٧	
230		Lack of adherence to Rules of the Air - adherence to Controller clearance				V	٧	
231		Lack of adherence to SOP for GND movements.	V	V				
232		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity	V				٧	
233		Failure to check navigation accuracy before approach			V			1
234		High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,)		٧				V
235		Late deceleration and configuration set-up for approach and landing		V				V
236		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. Navigational aid failure.			٧			
237		Not recognized ground Navaids System failure not reflected in NOTAM messages			V			
238		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components		٧			V	
239		Flaws in aircraft system maintenance process definition - Hydraulic System		V			٧	
240		Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS)			V			



	Safety Performance	Drocurrors		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
241		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS)			V			
242		Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS)			V			
243		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.				V	٧	
244		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.				V	V	
245		Flaws in manufacturer quality control process - Communication equipment systems and components.				V	V	
246		Lack of adherence to SOP for AIR operations in terms of controller error in approach clearence instruction			V			
247		Poor application of T/O & RTO procedure, aircraft handling					٧	
248		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum		V			V	V
249		Navigation deviation				V	٧	
250		Flaws in Airspace and Air Traffic planning procedures design process				V	٧	
251		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components		V			٧	
252		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake)	V				V	
253		Poor application of T/O & RTO procedure, failure recognition and preparedness					٧	
254		Flaws in aircraft system maintenance process definition - Fire detection system components		٧			٧	
255		Flaws in manufacturer quality control process - Fire detection system components		٧			٧	
256		Flaws in aircraft system maintenance process definition - Fire warning system		٧			٧	
257		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system		V			٧	
258		Flaws in manufacturer quality control process - Fire warning system		V			٧	
259		Lack of adherence to AFM limitations for Take-off		V			٧	
260		Unstabilized final approach (high, fast, steep,)		V				V
261		Inadvertent deviation from cleared taxi route	٧					
262		Difference indications of independent aircraft speed / altitude or attitude indicators		V				
263		Inadequate maintenance of fire vulnerable aircraft parts or components		V				
264		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements in terms of fire resistance		V				
265		Lack of adherence to regulations concerning transport of DGR goods		٧				



	Safety Performance	Duranturana		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
266		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Electrical / wiring system components		V				
267		Flaws in manufacturer quality control process - Electrical / wiring systems components		V				
268		Takeoff without clearance	V				V	
269		Landing without clearance	V				V	
270		Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	V				V	
271		Unintuitive and / or error prone system manual - FMC					V	
272		Lack of adherence to SOP in terms of fuelling procedure		V				
273		Undetected incorrect takeoff configuration					V	
274		Unintuitive and / or error prone system manual - communication equipment.				V		
275		Incorrect use of communication equipment				٧		
276		Separation of structural element / component of the aircraft during take-off or landing		V				
277		Lack of adherence to engine limitations		V				
278		Failure to remember / assess crosswind component limit for prevailing runway condition					V	٧
279		Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	V				٧	
280		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Anti-icing system components		٧				
281		Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications	V				V	
282		Lack of adherence to SOP for take-off procedure in terms of altimeter callibration.				V		
283		Excessive pitch attitude		V				
284		Excessive bank angle		V				
285		Tactical or / and Planning Controller tiredness - Inadequate workload distribution				V		
286		Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology				٧		
287		Altitude deviation				V		
288		Level bust (pilot lapse or late re-clearance by ATC)				٧		
289		Failure to comply with an altitude or speed restriction / constraint				٧		
290		Inadequate coordination between ATM centers and/or ATC sectors				٧		
291		Flaws in conflict and separation minima infringement detection / elimination procedures				٧		
292		Lack of adherence of airlines to time contraints and deadlines in terms of providing the Network Manager Operation Centre				V		



	Safety Performance	Draguesas		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
		with obligatory data.					1	
293		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MTCD System				V		
294		Lack of adherence of airlines to declared Flight Plan.				V		
295		Failure to identify the pre-tactical conflict before it reach the tactical controller				V	<u> </u>	
296		Lack of adherence to SOP for Airborne operation in terms of minimum seprataion				V	1	
297		Military activity in controlled airport or located within controlled area				V	1	
298		General aviation activity in controlled airport or located within controlled area				V		
299		Intensified traffic related to general aviation activity e. g. over GA airport / airfield				V		
300		Deviation from flight trajectory commanded by controller				V		
301		Flaws in manufacturer quality control process - Anti-icing system components		V				
302		Flaws in aircraft system maintenance process definition - Anti-icing systems components		٧				
303		DME / ILS DME confusion in assessing the final descent point / FAF		٧				٧
304		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components		٧			٧	
305		Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling		V			V	
306		Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared		٧				٧
307		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System.		V				٧
308		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of fire detection / warning or / and extinguishing system.		٧				
309		Flaws in manufacturer quality control process - Power supply system components		V			V	
310		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system		٧				٧
311		Lack of adherence to AFM in terms of emergency procedures - stall recovery		V			V	
312		Flaws in manufacturer quality control process - PWS system components		V			1	٧
313		Imbalanced and inaproppriate relation between cpt and his subordinates			V		1	
314		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.		V				٧
315		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - LLWAS system		٧				٧
316		Flaws in aircraft system maintenance process definition - Fire extinguishing system components		٧			٧	
317		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance					V	



	Safety Performance	Precursors		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
		with requirements - Power supply system components						
318		Lack of adherence to SOP in terms of aircraft icing (condition) monitoring		٧			٧	
319		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FCS system or components		٧			٧	
320		Flaws in manufacturer quality control process - FCS system components		V			V	
321		Flaws in aircraft system maintenance process definition - FCS systems or components		V			V	
322		Unintuitive and / or error prone system manual - ground radar.	V				٧	
323		Late rejected takeoff decision / initiation					٧	
324		Descent above desired descent profile		V				٧
325		Callsign confusion	V					
326		Lack of adherence to SOP in terms of ATCO and approach or ground controller communication	V					
327		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground Radar	٧					
328		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ground radar at the airport.	٧					
329		Lack of adherence to SOP in terms of awareness on supporting systems (warning) - ground radar.	V					
330		Lack of adherence to AFM limitations for landing		V				٧
331		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine		V			٧	
332		Flaws in manufacturer quality control process - Autothrottle system in the engine.		V			V	
333		Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.		V			V	
334		Lack of adherence to AFM in terms of emergency procedures - engine restart procedure		V				
335		Lack of adherence to SOP in terms of awareness on supporting systems warning		V				
336		Unintuitive and / or error prone system manual - ECAM		٧				
337		Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations					٧	
338		Tailwind component above limit						٧
339		Flaws in manufacturer quality control process - Engine sensors		V				
340		Flaws in aircraft system maintenance process definition - Engine sensors		٧				
341		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine sensors		V				
342		Lack of adherence to emergency procedures - WEM		V				V



	Safety Performance	Duanisana		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
343		Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.		V			٧	
344		Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT)		V			٧	
345		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - antiice fluid HOT		V			٧	
346		Lack of adherence to SOP in terms of safety best practices		V				
347		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of STCA System.				V		
348		Lack of adherence to regulations concerning independent ATCO monitoring				V		
349		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - STCA System				V		
350		Lack of adherence to AFM in terms of emergency procedures - fire detection and extinguishing procedure		V				
351		Lack of adherence to SOP for GND movements. Poor execution of parking / docking /pushback procedure	V					
352		Go-around attempt after thrust reversers deployment		V				V
353		Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing		V			٧	
354		Flaws in aircraft system maintenance process definition - ADI system components		V				
355		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ADI system components		V				
356		Flaws in manufacturer quality control process - ADI system components		V				
357		Slow rotation (i.e., low pitch rate)					٧	
358		Lack of adherence to emergency procedures - RWY collision avoidance	V					
359		Incorrect use of automation - TOCW System					٧	
360		Flaws in aircraft system maintenance process definition - TOCW System					٧	
361		Unintuitive and / or error prone system manual - TOCW					٧	
362		Inadequate effectivenes of fire extinguishing system		V				
363		Lack of adherence to the SOP in terms of critical maneuvre execution		V				
364		Applied de-icing / anti-icing method is not sufficient for predicted conditions		V			٧	
365		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System					٧	
366		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment	V					
367		Incorrect use of automation - Anti-icing system		V				
368		Unintuitive and / or error prone system manual - Anti-icing system		V				



	Safety Performance	Ducasinosus		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
369		Lack of adherence to SOP in terms of pre-flight inspections -presence of anti-contamination covers on pitot static tube		٧				
370		Lack of adherence to SOP in terms of briefing and checklist before initiating of start of taxiing and take-off		V				
371		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Pitot static system components		٧				
372		Flaws in manufacturer quality control process - Pitot static system components		V				<u> </u>
373		Flaws in aircraft system maintenance process definition - Pitot static systems components		V				
374		Lack of adherence to SOP for take-off procedure in terms of speed bug checklist preparation and verification.					٧	
375		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ADI		٧				
376		Flaws in manufacturer quality control process - ADI		V				
377		Flaws in aircraft system maintenance process definition - ADI		V				
378		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ASI		٧				
379		Flaws in manufacturer quality control process - ASI		V				1
380		Flaws in aircraft system maintenance process definition - ASI		V				
381		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PFD		٧				
382		Flaws in manufacturer quality control process - PFD		V				
383		Flaws in aircraft system maintenance process definition - PFD		V				
384		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine fuel distribution system		٧				
385		Flaws in manufacturer quality control process - Engine fuel distribution system		V				
386		Flaws in aircraft system maintenance process definition - Engine fuel distribution system		V				
387		Unintuitive and / or error prone system manual - fire extinguishing system		V				
388		Late activation of pedal braking or takeover from autobrake, when so required		V				٧
389		Delayed selection of reverse thrust		V				V
390		Inappropriate selection of autobrake mode for given runway length and condition		٧				٧
391		Poor application of T/O & RTO procedure, braking initiation sequence					٧	
392		Lack of adherence to SOP in terms of requested information support for other aircraft in terms of adverse weather conditions		٧				
393		Lack of adherence to SOP in terms of application of findings from weather report		V				



	Safety Performance	Precursors		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
394		Lack of adherence to SOP in terms of AFM limitations in terms of weigh and balance		V			<u> </u>	
395		Flaws in aircraft system maintenance process definition - stickshaker		V			V	
396		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - stickshaker system components		V			V	
397		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment					V	
398		Flight below maneuvering speeds		V				
399		Lack of adherence to SOP in terms of awareness on supporting systems warning - stickshaker		V			V	
400		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.					V	
401		Incorrect weather report obtained by the flight crew		V				
402		Lack of adherence of passengers to the recommendation: Fasten seat belt while seated		V				
403		Lack of adherence to SOP in terms of "fasten your seat belt" information activation in passenger cabin during flight in turbulence conditions		V				
404		Lack of adherence to SOP in terms of load sheet preparation and verification		V				
405		Lack of adherence to the current technology standards in terms of flight safety and efficiency - fuel tank allocation.		V				
406		Lack of adherence to emergency procedures - recovery from severe FCS failure		V				
407		Flaws in airport capacity management process					٧	
408		Unintuitive and / or error prone system manual - On-board weather radar.		V				
409		Incorrect use of automation - On-board weather radar		V				
410		Inadequate airline / regulatory provider policy in terms of aware of the risks related to air travel		V				
411		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - On-board weather radar		V				
412		Flaws in manufacturer quality control process - On-board weather radar		V				
413		Flaws in aircraft system maintenance process definition - On-board weather radar		V				
414		Lack of adherence to SOP in terms of providing flight crew with current weather report		V				
415		Poor application of T/O & RTO procedure, computation of T/O parameters					V	
416		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Rudder components.		V				
417		Flaws in aircraft system maintenance process definition - Rudder components.		٧				<u> </u>
418		Flaws in manufacturer quality control process - Rudder components.		V				
419		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Horizontal stabilizer components.		V				



	Safety Performance	Data assume and		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
420		Flaws in aircraft system maintenance process definition - Horizontal stabilizer components.		V				
421		Flaws in manufacturer quality control process - Horizontal stabilizer components.		V				
422		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Thrust reverse system in the engine.		V				
423		Flaws in manufacturer quality control process - Thrust reverse system in the engine.		V				
424		Flaws in aircraft system maintenance process definition - Thrust reverse system in the engine.		V				
425		Lack of adherence to SOP for take-off procedure in terms of time limitation for take-off preparation.					٧	
426		Inadequate crosswind landing / decrab technique						٧
427		Touchdown off centerline						V
428		Inappropriate use of differential reverse thrust						٧
429		Lack of adherence to SOP in terms of pre-flight inspections - cargo securing quality		V				
430		Inadequate use of differential braking						٧
431		Use of nose wheel steering tiller during rollout						٧
432		Lack of adherence to SOP in terms of awareness on supporting systems (warning) - RIMCAS.	V					
433		Error in calculation of necessary amount of fuel		V				V
434		Lack of adherence to SOP in terms of pre-flight inspections - ice presence on aircraft		V				
435		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components		V				
436		Flaws in aircraft system maintenance process definition - Aircraft door system and / or components		V				
437		Long / floating flare						٧
438		Lack of adherence to ICAO Annex 14 and related documents in terms of airside lights distribution	V					
439		Lack of adherence to ICAO Annex 14 and related documents in terms of nonrestricted view on airsite from TWR	V					
440		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of Runway Conflict Warning System.	V					
441		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - RCWS	V					
442		Lack of adherence to TO procedure in terms of antiice protection		V				
443		Flaws in manufacturer quality control process - anti-ice fluid specifications (HOT)		V				
444		Lack of adherence to the SOP in terms of critical maneuvre execution - flare		V				
445		Extreme operation condition / poor maintenance quality / advanced life lenght		V				



	Safety Performance	Ducasiyaaya		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
446		Failure to arm ground-spoilers		V				٧
447		Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain)			V			
448		Premature descent to DA(H) before G/S intercept or premature descent to MDA(H) before final-descent-point / FAF			V			
449		Premature descent below MDA(H) before reaching the visual-descent-point (VDP)			V			
450		Flight below desired flight path during initial and/or final approach			V			
451		Continued approach, when below DA(H) or MDA(H), after loss of visual references			V			
452		Late or inadequate response to MSAW warning			V			
453		Failure to go-around, when so required			V			
454		Failure to follow published missed-approach procedure			V			
455		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of MSAW system.			V			
456		Lack of adherence to emergency procedures - flight deck smoke procedure		V				
457		Lack of adherence to AFM in terms of emergency procedures - windshear recovery		V				
458		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MSAW System			V			
459		Lack of adherence to the current technology standards in terms of flight safety and efficiency - engines location.		V				
460		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. MSAW warning.			V			
461		Flaws in manufacturer quality control process - CPCS system and / or components		V				
462		Flaws in aircraft system maintenance process definition - CPCS system and / or components		V				
463		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - CPCS system and / or components		V				
464		Incorrect use of automation - CPCS		V				
465		Inadequate stall recovery procedure for the aircraft	V				V	
466		Late thrust reduction or power-on touchdown		V				٧
467		Use of non-standard phraseology by pilot flying (PF) and/or pilot not flying (PNF)		V				
468		Lack of adherence to SOP in terms of necessary amount of fuel		V				٧
469		Flaws in manufacturer quality control process - Stickshaker system components		٧			V	
470		Lack of adherence to AFM in terms of emergency procedures - engine failure		٧				
471		Inadequate management / separation of takeoffs and landings	V					
472		Flaws in manufacturer quality control process - TOCW system components					V	



	Safety Performance	Ducasina		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
473		Lack of adherence to SOP for approach and landing		٧				
474		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment		V				
475		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ACAS system components				٧		
476		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS			V			
477		Inappropriate visual avoidance maneuver				٧		
478		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ACAS installed on aircraft.				٧		
479		Late or inadequate response to ACAS warning				V		
480		Taxiing without clearance		V				
481		Flaws in aircraft system maintenance process definition - GPWS system components			V			
482		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - GPWS system components			٧			
483		Flaws in manufacturer quality control process - GPWS system components			V			
131	The safety impact of each significant ATM provision modification is assessed and deemed acceptable before the actual introduction of the modification	Pilot tiredness - Inadequate workload distribution	V	V	V	V	V	V
132		Flaws in pilot requirements definition process and/or training methodology	V	V	V	V	V	V
133		Traffic controller tiredness - Inadequate workload distribution	V	V	V	V	V	
134		Flaws in traffic controller requirements definition process and/or training methodology	V	V	V	V	V	
135		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	V	٧	٧	٧	V	٧
136		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	V	٧	V	٧	V	V
137		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	V	V	V	V	٧	V
138		Lack of or poor communication quality	V		V	V	V	
139		Use of non-standard phraseology by pilot and/or controller	V	٧	V	V	٧	
140		Lack of English proficiency	V	٧	V	V	٧	
141		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	V		V	V	٧	



	Safety Performance	Ducasiyaaya		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
142		Flaws in CRM training procedures		V	٧		٧	V
143		Lack of adherence to the main CRM rules		V	٧		V	V
144		Lack of adherence to SOP in terms of approach and landing		V	٧			V
145		Incorrect use of automation - FMS		V	٧			V
146		Unintuitive and / or error prone system manual - FMS		V	٧			V
147		Incorrect or confusing / misleading ATC instructions	V	V	V	V	V	
148		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)			٧	٧	V	
149		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components			٧	V	V	
150		Flaws in manufacturer quality control process - Onboard navigational systems and components.			>	٧	٧	
151		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.		V	٧			٧
152		Current airport diagram not reflecting critical changes	V		V			
153		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path		V				V
154		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)			>	٧	>	
155		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)			>	٧	٧	
156		Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing		V				V
157		Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather.		V				٧
158		Altimeter setting error			٧	V		
159		Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure		V				V
160		Lack of adherence to emergency procedures - control recovery		V				V
161		Hearback ommitted	V			٧		
162		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.			٧	٧	V	
163		Flaws in manufacturer quality control process - Fire extinguishing system components		V		V	٧	
164		Lack of adherence to Rules of the Air - adherence to Controller clearance				V	٧	
165		Flaws in Airspace and Air Traffic planning procedures design process				V	V	
166		Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.	V				٧	
167		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence	V				٧	



	Safety Performance	_		Op	eration	al issu		
No.	Indicators	Precursors	1	2	3	4	5	6
168		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity	V				V	
169		Lack of adherence to the SOP in terms of critical indicators cross-checking			V			
170		Failure to check navigation accuracy before approach			V			
171		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. Navigational aid failure.			V			
172		Not recognized ground Navaids System failure not reflected in NOTAM messages			V			
173		Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS)			V			
174		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS)			V			
175		Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS)			V			
176		Aggressive maneuvering / overcontrolling		V				٧
177		Lack of adherence to SOP for AIR operations in terms of controller error in approach clearence instruction			V			
178		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).			٧			
179		Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination			V			
180		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.				٧	V	
181		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.				٧	٧	
182		Flaws in manufacturer quality control process - Communication equipment systems and components.				٧	V	
183		Tactical or / and Planning Controller tiredness - Inadequate workload distribution				V		
184		Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology				V		
185		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components		V			V	
186		Flaws in aircraft system maintenance process definition - Hydraulic System		V			V	
187		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components		V			V	
188		Flaws in aircraft system maintenance process definition - APU systems and / or components		V			V	
189		Lack of adherence to SOP for GND movements.	V	٧				
190		Navigation deviation				V	٧	
191		Takeoff without clearance	V				٧	
192		Landing without clearance	V				٧	



	Safety Performance	D		Operational issue 1 2 3 4 5							
No.	Indicators	Precursors	1	2	3	4	5	6			
193		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components		V			٧				
194		Inadvertent deviation from cleared taxi route	V								
195		Inadequate coordination between ATM centers and/or ATC sectors				٧					
196		Flaws in aircraft system maintenance process definition - Fire detection system components		V			٧				
197		Flaws in manufacturer quality control process - Fire detection system components		V			٧				
198		Flaws in aircraft system maintenance process definition - Fire warning system		V			٧				
199		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system		V			٧				
200		Flaws in manufacturer quality control process - Fire warning system		V			٧				
201		Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	V				٧				
202		Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	V				٧				
203		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.		V			٧				
204		Inadequate maintenance of fire vulnerable aircraft parts or components		V							
205		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements in terms of fire resistance		V							
206		Flaws in aircraft system maintenance process definition - Fuel system compoonents		V							
207		Unintuitive and / or error prone system manual - CPCS		٧			٧	V			
208		Lack of adherence to SOP in terms of fuelling procedure		V							
209		Flaws in aircraft system maintenance process definition - Electrical wiring System		٧							
210		Altitude deviation				V					
211		Level bust (pilot lapse or late re-clearance by ATC)				٧					
212		Flaws in conflict and separation minima infringement detection / elimination procedures				V					
213		Lack of adherence of airlines to time contraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data.				٧					
214		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fuel system components		V							
215		Lack of adherence to regulations concerning transport of DGR goods		V							
216		Lack of adherence to engine limitations		V							
217		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components		V							



	Safety Performance	D		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
218		Flaws in manufacturer quality control process - Engine systems and / or components		٧				
219		Flaws in aircraft system maintenance process definition - Engine systems and / or components		V				
220		Flaws in manufacturer quality control process - APU systems and / or components		V				
221		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Electrical / wiring system components		V				
222		Flaws in manufacturer quality control process - Electrical / wiring systems components		٧				
223		Unintuitive and / or error prone system manual - communication equipment.				V		
224		Incorrect use of communication equipment				V		
225		Deviation from flight trajectory commanded by controller				V		
226		Separation of structural element / component of the aircraft during take-off or landing		>				
227		Failure to comply with an altitude or speed restriction / constraint				V		
228		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MTCD System				V		
229		Lack of adherence of airlines to declared Flight Plan.				V		
230		Failure to identify the pre-tactical conflict before it reach the tactical controller				V		
231		Lack of adherence to SOP for Airborne operation in terms of minimum seprataion				V		
232		Military activity in controlled airport or located within controlled area				V		
233		General aviation activity in controlled airport or located within controlled area				V		
234		Intensified traffic related to general aviation activity e. g. over GA airport / airfield				V		
235		Lack of adherence to SOP for take-off procedure in terms of altimeter callibration.				V		
236		Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications	V				٧	
237		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of fire detection / warning or / and extinguishing system.		٧				
238		Imbalanced and inaproppriate relation between cpt and his subordinates			V			
239		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components		V			V	
240		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		V			V	V
241		Flaws in aircraft system maintenance process definition - Fire extinguishing system components		٧		<u> </u>	٧	
242		Callsign confusion	V					



	Safety Performance	Ducasinosia		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
243		Lack of adherence to SOP in terms of ATCO and approach or ground controller communication	V					
244		Unintuitive and / or error prone system manual - ground radar.	V					
245		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground Radar	V					
246		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ground radar at the airport.	V					
247		Lack of adherence to SOP in terms of awareness on supporting systems (warning) - ground radar.	V					
248		Descent above desired descent profile		V				٧
249		High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,)		V				V
250		Late deceleration and configuration set-up for approach and landing		V				V
251		DME / ILS DME confusion in assessing the final descent point / FAF		V				V
252		Unstabilized final approach (high, fast, steep,)		V				٧
253		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of STCA System.				V		
254		Lack of adherence to regulations concerning independent ATCO monitoring				V		
255		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - STCA System				V		
256		Lack of adherence to AFM in terms of emergency procedures - fire detection and extinguishing procedure		V				
257		Go-around attempt after thrust reversers deployment		V				V
258		Lack of adherence to AFM limitations for landing		V				٧
259		Lack of adherence to emergency procedures - RWY collision avoidance	V					
260		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		٧			٧	
261		Inadequate effectivenes of fire extinguishing system		V				
262		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Integrity of primary aircraft structure.		٧				
263		Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.		٧				
264		Flaws in manufacturer quality control process - Integrity of primary aircraft structure.		V				
265		Unintuitive and / or error prone system manual - fire extinguishing system		٧				
266		Lack of adherence to SOP for GND movements. Poor execution of parking / docking /pushback procedure	V					
267		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake)	٧					



	Safety Performance	Ducasinosia	1	Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
268		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					٧	
269		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment	V					
270		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components					V	
271		Lack of adherence to SARPs in terms of avoiding adverse weather conditions during flight		V				<u> </u>
272		Lack of adherence to SOP in terms of providing flight crew with current weather report		V				
273		Flaws in manufacturer quality control process - Power supply system components					٧	
274		Flaws in airport capacity management process					٧	
275		Lack of adherence to SOP for take-off procedure in terms of time limitation for take-off preparation.					٧	
276		Inadequate aircraft de-icing / anti-icing					V	
277		Lack of adherence to SOP in terms of requested information support for other aircraft in terms of adverse weather conditions		V				
278		Incorrect weather report obtained by the flight crew		V				
279		Lack of adherence to SOP in terms of application of findings from weather report		٧				
280		Lack of adherence of passengers to the recommendation: Fasten seat belt while seated		V				
281		Lack of adherence to SOP in terms of "fasten your seat belt" information activation in passenger cabin during flight in turbulence conditions		٧				
282		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.					V	
283		Flaws in aircraft system maintenance process definition - Components of Wing control surface system.					V	
284		Flaws in manufacturer quality control process - Components of Wing control surface system.					٧	
285		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine					V	
286		Flaws in manufacturer quality control process - Autothrottle system in the engine.					٧	
287		Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.					V	
288		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring					V	
289		Unintuitive and / or error prone system manual - On-board weather radar.		V				
290		Incorrect use of automation - On-board weather radar		V				
291		Inadequate airline / regulatory provider policy in terms of aware of the risks related to air travel		٧				
292		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - On-board weather radar		V				



	Safety Performance	Precursors		Ор	eration	al issu	e	
No.	Indicators	riecuisois	1	2	3	4	5	6
293		Flaws in manufacturer quality control process - On-board weather radar		V				
294		Flaws in aircraft system maintenance process definition - On-board weather radar		V				
295		Lack of adherence to SOP in terms of awareness on supporting systems (warning) - RIMCAS.	٧					
296		Late rejected takeoff decision / initiation					V	
297		Flaws in manufacturer quality control process - Landing gear components.		٧				
298		Flaws in aircraft system maintenance process definition - Landing gear components.		V				
299		Lack of adherence to ICAO Annex 14 and related documents in terms of airside lights distribution	٧					
300		Lack of adherence to ICAO Annex 14 and related documents in terms of nonrestricted view on airsite from TWR	V					
301		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of Runway Conflict Warning System.	V					
302		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum		V			٧	V
303		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - RCWS	V					
304		Poor application of T/O & RTO procedure, failure recognition and preparedness					V	
305		Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations					V	
306		Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain)			V			
307		Premature descent to DA(H) before G/S intercept or premature descent to MDA(H) before final-descent-point / FAF			V			
308		Premature descent below MDA(H) before reaching the visual-descent-point (VDP)			V			
309		Flight below desired flight path during initial and/or final approach			V			
310		Continued approach, when below DA(H) or MDA(H), after loss of visual references			V			
311		Late or inadequate response to MSAW warning			V			
312		Failure to go-around, when so required			V			
313		Failure to follow published missed-approach procedure			V			
314		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of MSAW system.			V			
315		Lack of adherence to emergency procedures - flight deck smoke procedure		V				
316		Lack of adherence to the SOP in terms of critical maneuvre execution - flare		V				
317		Extreme operation condition / poor maintenance quality / advanced life lenght		V				
318		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components		V				



	Safety Performance	Precursors		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
319		Flaws in aircraft system maintenance process definition - Aircraft door system and / or components		V				
320		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MSAW System			V			
321		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. MSAW warning.			V			
322		Flaws in manufacturer quality control process - CPCS system and / or components		V				
323		Flaws in aircraft system maintenance process definition - CPCS system and / or components	1	٧				
324		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - CPCS system and / or components		V				
325		Incorrect use of automation - CPCS		V				
326		Late activation of pedal braking or takeover from autobrake, when so required		V				V
327		Delayed selection of reverse thrust		V				V
328		Late thrust reduction or power-on touchdown		V				V
329		Failure to arm ground-spoilers		V				V
330		Inappropriate selection of autobrake mode for given runway length and condition		V				٧
331		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment					٧	
332		Poor application of T/O & RTO procedure, braking initiation sequence					٧	
333		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.					٧	
334		Error in calculation of necessary amount of fuel		V				V
335		Lack of adherence to SOP in terms of necessary amount of fuel		V				V
336		Poor application of T/O & RTO procedure, computation of T/O parameters					٧	
337		Flaws in aircraft system maintenance process definition - stickshaker			V			
338		Inadequate management / separation of takeoffs and landings	V					
339		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ACAS system components				V		
340		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS			V			
341		Inappropriate visual avoidance maneuver				V		
342		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ADI system components				V		
343		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ACAS installed on aircraft.				V		
344		Late or inadequate response to ACAS warning				V		



	Safety Performance	Ducasina		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
345		Flaws in aircraft system maintenance process definition - GPWS system components			V			
346		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - GPWS system components			V			
347		Flaws in manufacturer quality control process - GPWS system components			V			
131	The actual safety impact of each significant ATM provision modification is evaluated at most after 3 years of implementation of the modification	Pilot tiredness - Inadequate workload distribution	V	V	V	V	V	V
132		Flaws in pilot requirements definition process and/or training methodology	V	V	V	V	V	V
133		Traffic controller tiredness - Inadequate workload distribution	V	V	V	V	V	
134		Flaws in traffic controller requirements definition process and/or training methodology	V	V	V	V	٧	
135		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	V	V	V	V	V	V
136		Lack of or poor communication quality	V		V	V	V	
137		Use of non-standard phraseology by pilot and/or controller	V	V	V	V	V	
138		Lack of English proficiency	V	V	V	V	V	
139		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	V		V	V	V	
140		Flaws in CRM training procedures		V	V		V	V
141		Lack of adherence to the main CRM rules		V	V		٧	V
142		Lack of adherence to SOP in terms of approach and landing		V	V			V
143		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	V	V	V	V	٧	V
144		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	٧	V	V	V	٧	V
145		Incorrect use of automation - FMS		V	V			V
146		Unintuitive and / or error prone system manual - FMS		V	V			V
147		Incorrect or confusing / misleading ATC instructions	٧	V	V	٧	V	
148		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)			V	V	٧	
149		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components			V	٧	V	
150		Flaws in manufacturer quality control process - Onboard navigational systems and components.			V	V	V	



	Safety Performance	Ducasinosus		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
151		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.		V	V			٧
152		Current airport diagram not reflecting critical changes	V		V			
153		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path		V				V
154		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)			V	V	٧	
155		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)			V	V	٧	
156		Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing		V				V
157		Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather.		V				V
158		Altimeter setting error			V	V		
159		Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure		V				V
160		Lack of adherence to emergency procedures - control recovery		V				V
161		Hearback ommitted	V			V		
162		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.			V	٧	V	
163		Lack of adherence to Rules of the Air - adherence to Controller clearance				V	V	
164		Flaws in Airspace and Air Traffic planning procedures design process				V	V	
165		Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.	V				V	
166		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence	V				V	
167		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity	٧				V	
168		Lack of adherence to the SOP in terms of critical indicators cross-checking			V			
169		Failure to check navigation accuracy before approach			V			
170		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. Navigational aid failure.			V			
171		Not recognized ground Navaids System failure not reflected in NOTAM messages			V			
172		Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS)			V			
173		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS)			V			
174		Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS)			V			
175		Aggressive maneuvering / overcontrolling		V				V



	Safety Performance	Ducasiyaaya		Ор	eration	al issu	е	
No.	Indicators	Precursors	1	2	3	4	5	6
176		Lack of adherence to SOP for AIR operations in terms of controller error in approach clearence instruction			V			
177		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).			V			
178		Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination			V			
179		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.				V	V	
180		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.				V	V	
181		Flaws in manufacturer quality control process - Communication equipment systems and components.				V	٧	
182		Tactical or / and Planning Controller tiredness - Inadequate workload distribution				V		
183		Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology				V		
184		Lack of adherence to SOP for GND movements.	V	V				
185		Navigation deviation				V	٧	
186		Takeoff without clearance	V				٧	
187		Landing without clearance	V				٧	
188		Flaws in manufacturer quality control process - Fire extinguishing system components				V	٧	
189		Inadvertent deviation from cleared taxi route	V					
190		Inadequate coordination between ATM centers and/or ATC sectors				٧		
191		Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	V				٧	
192		Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	V				٧	
193		Unintuitive and / or error prone system manual - CPCS		V			٧	V
194		Altitude deviation				V		
195		Level bust (pilot lapse or late re-clearance by ATC)				V		
196		Flaws in conflict and separation minima infringement detection / elimination procedures				V		
197		Lack of adherence of airlines to time contraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data.				V		
198		Unintuitive and / or error prone system manual - communication equipment.				V		
199		Incorrect use of communication equipment				V		
200		Deviation from flight trajectory commanded by controller				V		
201		Failure to comply with an altitude or speed restriction / constraint				V		



	Safety Performance	Duaniusaus		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
202		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MTCD System				V		
203		Lack of adherence of airlines to declared Flight Plan.				V		
204		Failure to identify the pre-tactical conflict before it reach the tactical controller				V		
205		Lack of adherence to SOP for Airborne operation in terms of minimum seprataion				V		
206		Military activity in controlled airport or located within controlled area				V		
207		General aviation activity in controlled airport or located within controlled area				٧		
208		Intensified traffic related to general aviation activity e. g. over GA airport / airfield				V		
209		Lack of adherence to SOP for take-off procedure in terms of altimeter callibration.				٧		
210		Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications	V				V	
211		Imbalanced and inaproppriate relation between cpt and his subordinates			V			ł
212		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		٧			٧	V
213		Callsign confusion	٧					ł
214		Lack of adherence to SOP in terms of ATCO and approach or ground controller communication	V					
215		Unintuitive and / or error prone system manual - ground radar.	V					
216		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground Radar	V					
217		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ground radar at the airport.	V					
218		Lack of adherence to SOP in terms of awareness on supporting systems (warning) - ground radar.	V					
219		Descent above desired descent profile		V				٧
220		High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,)		V				V
221		Late deceleration and configuration set-up for approach and landing		V				٧
222		DME / ILS DME confusion in assessing the final descent point / FAF		V				٧
223		Unstabilized final approach (high, fast, steep,)		V				٧
224		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of STCA System.				V		
225		Lack of adherence to regulations concerning independent ATCO monitoring				٧		
226		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - STCA System				٧		



	Safety Performance	Drocursors		Op	eration	Operational issue						
No.	Indicators	Precursors	1	2	3	4	5	6				
227		Go-around attempt after thrust reversers deployment		V				٧				
228		Lack of adherence to AFM limitations for landing		V				V				
229		Lack of adherence to emergency procedures - RWY collision avoidance	V									
230		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		V			V					
231		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Integrity of primary aircraft structure.		V								
232		Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.		V								
233		Flaws in manufacturer quality control process - Integrity of primary aircraft structure.		V								
234		Lack of adherence to SOP for GND movements. Poor execution of parking / docking /pushback procedure	V									
235		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake)	V									
236		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					V					
237		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment	V									
238		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components					٧					
239		Lack of adherence to SARPs in terms of avoiding adverse weather conditions during flight		V								
240		Lack of adherence to SOP in terms of providing flight crew with current weather report		V								
241		Flaws in manufacturer quality control process - Power supply system components					V					
242		Flaws in airport capacity management process					V					
243		Lack of adherence to SOP for take-off procedure in terms of time limitation for take-off preparation.					٧					
244		Inadequate aircraft de-icing / anti-icing					V					
245		Lack of adherence to SOP in terms of requested information support for other aircraft in terms of adverse weather conditions		٧								
246		Incorrect weather report obtained by the flight crew		V								
247		Lack of adherence to SOP in terms of application of findings from weather report		V								
248		Lack of adherence of passengers to the recommendation: Fasten seat belt while seated		V								
249		Lack of adherence to SOP in terms of "fasten your seat belt" information activation in passenger cabin during flight in turbulence conditions		٧								
250		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.					V					
251		Flaws in aircraft system maintenance process definition - Components of Wing control surface system.					V					



	Safety Performance	Drocursors		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
252		Flaws in manufacturer quality control process - Components of Wing control surface system.					V	
253		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine					٧	
254		Flaws in manufacturer quality control process - Autothrottle system in the engine.					V	
255		Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.					V	
256		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components					V	
257		Flaws in aircraft system maintenance process definition - Hydraulic System					V	
258		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring					V	
259		Unintuitive and / or error prone system manual - On-board weather radar.		V				
260		Incorrect use of automation - On-board weather radar		V				
261		Inadequate airline / regulatory provider policy in terms of aware of the risks related to air travel		V				
262		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - On-board weather radar		V				
263		Flaws in manufacturer quality control process - On-board weather radar		V				
264		Flaws in aircraft system maintenance process definition - On-board weather radar		V				
265		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components					٧	
266		Flaws in aircraft system maintenance process definition - APU systems and / or components					V	
267		Flaws in aircraft system maintenance process definition - Fire detection system components					٧	
268		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components					٧	
269		Flaws in manufacturer quality control process - Fire detection system components					V	
270		Flaws in aircraft system maintenance process definition - Fire warning system					٧	
271		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system					٧	
272		Flaws in manufacturer quality control process - Fire warning system					V	
273		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components					٧	
274		Flaws in aircraft system maintenance process definition - Fire extinguishing system components					V	
275		Lack of adherence to SOP in terms of awareness on supporting systems (warning) - RIMCAS.	V					
276		Late rejected takeoff decision / initiation					٧	



	Safety Performance	Duranteen		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
277		Flaws in manufacturer quality control process - Landing gear components.		٧				
278		Flaws in aircraft system maintenance process definition - Landing gear components.		V				
279		Lack of adherence to ICAO Annex 14 and related documents in terms of airside lights distribution	V					
280		Lack of adherence to ICAO Annex 14 and related documents in terms of nonrestricted view on airsite from TWR	V					
281		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of Runway Conflict Warning System.	٧					
282		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum		V			٧	٧
283		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - RCWS	V					
284		Poor application of T/O & RTO procedure, failure recognition and preparedness					V	
285		Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations					V	
286		Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain)			V			
287		Premature descent to DA(H) before G/S intercept or premature descent to MDA(H) before final-descent-point / FAF			V			
288		Premature descent below MDA(H) before reaching the visual-descent-point (VDP)			V			
289		Flight below desired flight path during initial and/or final approach			V			
290		Continued approach, when below DA(H) or MDA(H), after loss of visual references			V			
291		Late or inadequate response to MSAW warning			V			
292		Failure to go-around, when so required			V			
293		Failure to follow published missed-approach procedure			V			
294		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of MSAW system.			V			
295		Lack of adherence to emergency procedures - flight deck smoke procedure		V				
296		Lack of adherence to the SOP in terms of critical maneuvre execution - flare		V				
297		Extreme operation condition / poor maintenance quality / advanced life lenght		V				
298		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components		٧				
299		Flaws in aircraft system maintenance process definition - Aircraft door system and / or components		V				
300		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MSAW System			٧			
301		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. MSAW warning.			V			
302		Flaws in manufacturer quality control process - CPCS system and / or components		٧				



	Safety Performance	Precursors		Operational issue 1 2 3 4 5					
No.	Indicators	Precursors	1	2	3	4	5	6	
303		Flaws in aircraft system maintenance process definition - CPCS system and / or components		V					
304		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - CPCS system and / or components		V					
305		Incorrect use of automation - CPCS		V					
306		Late activation of pedal braking or takeover from autobrake, when so required		V				V	
307		Delayed selection of reverse thrust		٧				V	
308		Late thrust reduction or power-on touchdown		V				V	
309		Failure to arm ground-spoilers		V				V	
310		Inappropriate selection of autobrake mode for given runway length and condition		V				٧	
311		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment					٧		
312		Poor application of T/O & RTO procedure, braking initiation sequence					٧		
313		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.					٧		
314		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.					٧		
315		Error in calculation of necessary amount of fuel		V				V	
316		Lack of adherence to SOP in terms of necessary amount of fuel		V				٧	
317		Poor application of T/O & RTO procedure, computation of T/O parameters					٧		
318		Flaws in aircraft system maintenance process definition - stickshaker			V				
319		Inadequate management / separation of takeoffs and landings	V						
320		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ACAS system components				V			
321		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS			V				
322		Inappropriate visual avoidance maneuver				V			
323		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ADI system components				V			
324		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ACAS installed on aircraft.				V			
325		Late or inadequate response to ACAS warning				V			
326		Flaws in aircraft system maintenance process definition - GPWS system components			V				
327		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - GPWS system components			V				
328		Flaws in manufacturer quality control process - GPWS system components			V				



	Safety Performance	Ducassaca		Operational issue 1 2 3 4 5							
No.	Indicators	Precursors	1	2	3	4	5	6			
131	The safety impact of an aircraft flying under an outdated certification scheme is assessed after each significant change in certification rules	Pilot tiredness - Inadequate workload distribution	V	V	٧	V	V	V			
132		Flaws in pilot requirements definition process and/or training methodology	V	V	V	V	V	V			
133		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	V	V	V	V	V	V			
134		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	V	V	V	V	V	V			
135		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	V	V	V	V	V	V			
136		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		V			٧	V			
137		Traffic controller tiredness - Inadequate workload distribution	V	V	V	V	<u> </u>	V			
138		Flaws in traffic controller requirements definition process and/or training methodology	V	V	V	٧	1	V			
139		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.		V			٧	V			
140		Lack of adherence to SOP in terms of approach and landing		V	V		1	V			
141		Lack of adherence to the SOP in terms of critical indicators cross-checking		V	V		1				
142		Incorrect use of automation - FMS		V	V		1	V			
143		Unintuitive and / or error prone system manual - FMS		V	V			V			
144		Unintuitive and / or error prone system manual - CPCS		V			٧	V			
145		Flaws in CRM training procedures		V	V			V			
146		Lack of adherence to the main CRM rules		V	V			V			
147		Aggressive maneuvering / overcontrolling		V				V			
148		Lack of or poor communication quality	V		V	V	V				
149		Use of non-standard phraseology by pilot and/or controller	V	V	V	V					
150		Lack of English proficiency	V	V	V	V					
151		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring		٧			٧	٧			
152		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	V		V	٧					
153		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		٧			٧	٧			
154		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance		٧			٧				



	Safety Performance	Precursors		Ор	eration	al issu	е	
No.	Indicators	Precursors	1	2	3	4	5	6
		with requirements - Engine systems and / or components						
155		Inadequate aircraft de-icing / anti-icing		V			٧	
156		Flaws in manufacturer quality control process - Engine systems and / or components		V			٧	
157		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)		V	V	V	V	
158		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).		V	V			٧
159		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)		٧	V	V	٧	
160		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fuel system components		V				
161		Flaws in aircraft system maintenance process definition - Fuel system compoonents		٧				
162		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)		V	V	٧	٧	
163		Lack of adherence to SOP in terms of de-icing / anti-icing procedures.		V			٧	
164		Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing		V				V
165		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.		V	V			٧
166		Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather.		V				٧
167		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components			V	V	٧	
168		Flaws in manufacturer quality control process - Onboard navigational systems and components.			V	V	٧	
169		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path		V				٧
170		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Integrity of primary aircraft structure.		V				
171		Flaws in manufacturer quality control process - Integrity of primary aircraft structure.		٧				
172		Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.		V				
173		Lack of adherence to emergency procedures - control recovery		V				V
174		Incorrect or confusing / misleading ATC instructions	V	٧		٧		
175		Current airport diagram not reflecting critical changes	V		V			
176		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.		V			V	
177		Flaws in aircraft system maintenance process definition - Components of Wing control surface system.		V			٧	



	Safety Performance	Precursors		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
178		Flaws in manufacturer quality control process - Components of Wing control surface system.		٧			٧	
179		Lack of adherence to SARPs in terms of avoiding adverse weather conditions during flight		>				
180		Altimeter setting error			٧	V		
181		Lack of adherence to SOP in terms of AFM limitations		٧				
182		Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure		٧				V
183		Flaws in aircraft system maintenance process definition - Landing gear components.		V				
184		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components		V			V	
185		Flaws in aircraft system maintenance process definition - APU systems and / or components		V			V	
186		Flaws in manufacturer quality control process - Fuel system components.		٧				
187		Flaws in manufacturer quality control process - Landing gear components.		٧				
188		Flaws in aircraft system maintenance process definition - Engine systems and / or components		٧			٧	
189		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					٧	
190		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine anti-ice systems and / or components		٧				
191		Flaws in manufacturer quality control process - Engine anti-ice system and / or components		V				
192		Flaws in aircraft system maintenance process definition - Engine anti-ice system and / or components		٧				
193		Incorrect use of automation -Engine anti-ice system		٧				<u> </u>
194		Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination		٧	V			
195		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Reduction gear in the engine		V				
196		Flaws in manufacturer quality control process - Reduction gear in the engine.		٧				
197		Flaws in aircraft system maintenance process definition - Reduction gear in the engine.		V				
198		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.			V	V	V	
199		Inadequate de-icing method applied		٧				
200		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Compressor in the engine		V				
201		Flaws in manufacturer quality control process - Compressor in the engine.		٧				
202		Flaws in aircraft system maintenance process definition - Compressor in the engine.		٧				



	Safety Performance	D		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
203		Flaws in manufacturer quality control process - Engine accessory drive components.		٧				
204		Flaws in aircraft system maintenance process definition - Engine accessory drive components.		V				
205		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine accessory drive components.		V				
206		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ECAM (or similar) system components.		V				
207		Lack of adherence to emergency procedures - Fuel starvation		V				
208		Flaws in aircraft system maintenance process definition - Oil distribution system		V				
209		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Oil distribution system		٧				
210		Flaws in manufacturer quality control process - Oil distribution system		V				
211		Flaws in manufacturer quality control process - Fire extinguishing system components		V		٧	V	
212		Flaws in aircraft system maintenance process definition - ECAM (or similar) system components.		V				
213		Unintuitive and / or error prone system manual - Engine anti-icing system		V				
214		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ECAM.		V				
215		Flaws in manufacturer quality control process - ECAM (or similar) system components.		V				
216		Flaws in manufacturer quality control process - APU systems and / or components		V			V	
217		Hearback ommitted	V			V		
218		Flaws in aircraft system maintenance process definition - Engine combustor		V				
219		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine combustor		٧				
220		Flaws in manufacturer quality control process - Engine combustor		V				
221		Flaws in aircraft system maintenance process definition - Engine turbine components		V				
222		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine turbine components		V				
223		Flaws in manufacturer quality control process - Engine turbine components		V				
224		Flaws in aircraft system maintenance process definition - Electrical wiring System		٧			٧	
225		Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.					٧	
226		Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.					٧	
227		Incorrect stab-trim setting					V	



	Safety Performance	P		Op	eration	al issu		
No.	Indicators	Precursors	1	2	3	4	5	6
228		Failure to check navigation accuracy before approach			V			
229		High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,)		٧				V
230		Late deceleration and configuration set-up for approach and landing		V			1	٧
231		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. Navigational aid failure.			V			
232		Not recognized ground Navaids System failure not reflected in NOTAM messages			V		1	
233		Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS)			V			
234		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS)			V			
235		Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS)			V		<u> </u>	
236		Lack of adherence to SOP for GND movements.	V	V			<u> </u>	
237		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.				V	V	
238		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.				V	V	
239		Flaws in manufacturer quality control process - Communication equipment systems and components.				V	V	
240		Lack of adherence to SOP for AIR operations in terms of controller error in approach clearence instruction			V			
241		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components		V			V	
242		Flaws in aircraft system maintenance process definition - Hydraulic System		V			V	
243		Poor application of T/O & RTO procedure, aircraft handling					V	
244		Navigation deviation				V	V	
245		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components		V			V	
246		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake)	V				V	
247		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum		V			٧	٧
248		Poor application of T/O & RTO procedure, failure recognition and preparedness					V	
249		Flaws in aircraft system maintenance process definition - Fire detection system components		٧			٧	
250		Flaws in manufacturer quality control process - Fire detection system components		٧			٧	
251		Flaws in aircraft system maintenance process definition - Fire warning system		٧			٧	
252		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance		V			٧	



	Safety Performance	Durantena		Ор	eration	al issu	<u> </u>	
No.	Indicators	Precursors	1	2	3	4	5	6
		with requirements - Fire warning system						
253		Flaws in manufacturer quality control process - Fire warning system		V			٧	
254		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence	V					
255		Lack of adherence to AFM limitations for Take-off		V			V	
256		Unstabilized final approach (high, fast, steep,)		V				٧
257		Difference indications of independent aircraft speed / altitude or attitude indicators		V				
258		Inadvertent deviation from cleared taxi route	V					
259		Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.	V					
260		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity	V					
261		Unintuitive and / or error prone system manual - FMC					V	
262		Undetected incorrect takeoff configuration					V	
263		Unintuitive and / or error prone system manual - communication equipment.				٧		
264		Incorrect use of communication equipment				V		
265		Lack of adherence to regulations concerning transport of DGR goods		V				
266		Separation of structural element / component of the aircraft during take-off or landing		V				
267		Failure to remember / assess crosswind component limit for prevailing runway condition					V	٧
268		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Electrical / wiring system components		٧				
269		Flaws in manufacturer quality control process - Electrical / wiring systems components		V				
270		Lack of adherence to SOP in terms of fuelling procedure		٧				
271		Inadequate maintenance of fire vulnerable aircraft parts or components		V				
272		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements in terms of fire resistance		٧				
273		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Anti-icing system components		٧				
274		Lack of adherence to engine limitations		٧				
275		Lack of adherence to SOP for take-off procedure in terms of altimeter callibration.				٧		
276		Military activity in controlled airport or located within controlled area				٧		
277		General aviation activity in controlled airport or located within controlled area				V		



	Safety Performance	Drocursors		Op	eration	al issue	e	
No.	Indicators	Precursors	1	2	3	4	5	6
278		Excessive pitch attitude		V				
279		Excessive bank angle		V				
280		Lack of adherence to Rules of the Air - adherence to Controller clearance				V		
281		Tactical or / and Planning Controller tiredness - Inadequate workload distribution				V		
282		Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology				V		
283		Altitude deviation				V		
284		Level bust (pilot lapse or late re-clearance by ATC)				V		
285		Failure to comply with an altitude or speed restriction / constraint				V		
286		Inadequate coordination between ATM centers and/or ATC sectors				V		
287		Flaws in Airspace and Air Traffic planning procedures design process				V		
288		Flaws in conflict and separation minima infringement detection / elimination procedures				V		
289		Lack of adherence of airlines to time contraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data.				V		
290		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MTCD System				V		
291		Lack of adherence of airlines to declared Flight Plan.				V		
292		Failure to identify the pre-tactical conflict before it reach the tactical controller				V		
293		Lack of adherence to SOP for Airborne operation in terms of minimum seprataion				V		
294		Intensified traffic related to general aviation activity e. g. over GA airport / airfield				V		
295		Deviation from flight trajectory commanded by controller				V		
296		Flaws in manufacturer quality control process - Anti-icing system components		V				
297		Flaws in aircraft system maintenance process definition - Anti-icing systems components		٧				
298		DME / ILS DME confusion in assessing the final descent point / FAF		V				٧
299		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components		٧			V	
300		Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling		V			V	
301		Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared		٧				٧
302		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System.		٧				٧
303		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of fire detection / warning or / and extinguishing system.		٧				



	Safety Performance	Precursors		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
304		Flaws in manufacturer quality control process - Power supply system components		V			V	
305		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system		V				V
306		Lack of adherence to AFM in terms of emergency procedures - stall recovery		V			V	
307		Flaws in manufacturer quality control process - PWS system components		V				٧
308		Imbalanced and inaproppriate relation between cpt and his subordinates			V			
309		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.		V				٧
310		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - LLWAS system		٧				V
311		Flaws in aircraft system maintenance process definition - Fire extinguishing system components		V			V	
312		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components					٧	
313		Lack of adherence to SOP in terms of aircraft icing (condition) monitoring		V			V	
314		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FCS system or components		V			٧	
315		Flaws in manufacturer quality control process - FCS system components		V			V	
316		Flaws in aircraft system maintenance process definition - FCS systems or components		V			V	
317		Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	V					
318		Callsign confusion	V					
319		Takeoff without clearance	V					
320		Landing without clearance	٧					
321		Lack of adherence to SOP in terms of ATCO and approach or ground controller communication	V					
322		Unintuitive and / or error prone system manual - ground radar.	٧				V	
323		Descent above desired descent profile		V				٧
324		Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	٧					
325		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground Radar	V					
326		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ground radar at the airport.	V					
327		Lack of adherence to SOP in terms of awareness on supporting systems (warning) - ground radar.	V					
328		Lack of adherence to AFM limitations for landing		V				٧



	Safety Performance	Drocurrors		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
329		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine		V			V	
330		Flaws in manufacturer quality control process - Autothrottle system in the engine.		V			V	
331		Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.		V			V	
332		Lack of adherence to AFM in terms of emergency procedures - engine restart procedure		V				
333		Lack of adherence to SOP in terms of awareness on supporting systems warning		V				
334		Unintuitive and / or error prone system manual - ECAM		V				
335		Tailwind component above limit						V
336		Flaws in manufacturer quality control process - Engine sensors		V				
337		Flaws in aircraft system maintenance process definition - Engine sensors		V				
338		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine sensors		V				
339		Lack of adherence to emergency procedures - WEM		V				V
340		Lack of adherence to SOP in terms of safety best practices		V				<u> </u>
341		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of STCA System.				V		<u> </u>
342		Lack of adherence to regulations concerning independent ATCO monitoring				V		
343		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - STCA System				V		
344		Lack of adherence to AFM in terms of emergency procedures - fire detection and extinguishing procedure		V				<u> </u>
345		Lack of adherence to SOP for GND movements. Poor execution of parking / docking /pushback procedure	V					
346		Go-around attempt after thrust reversers deployment		V				٧
347		Flaws in aircraft system maintenance process definition - ADI system components		V				
348		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ADI system components		V				
349		Flaws in manufacturer quality control process - ADI system components		V				
350		Slow rotation (i.e., low pitch rate)					٧	
351		Lack of adherence to emergency procedures - RWY collision avoidance	V					
352		Incorrect use of automation - TOCW System					V	
353		Flaws in aircraft system maintenance process definition - TOCW System					V	
354		Unintuitive and / or error prone system manual - TOCW					٧	



	Safety Performance	D		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
355		Inadequate effectivenes of fire extinguishing system		٧				
356		Lack of adherence to the SOP in terms of critical maneuvre execution		V				
357		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System					V	
358		Incorrect use of automation - Anti-icing system		V				
359		Late rejected takeoff decision / initiation					>	
360		Unintuitive and / or error prone system manual - Anti-icing system		٧				
361		Lack of adherence to SOP in terms of pre-flight inspections -presence of anti-contamination covers on pitot static tube		٧				
362		Lack of adherence to SOP in terms of briefing and checklist before initiating of start of taxiing and take-off		٧				
363		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Pitot static system components		V				
364		Flaws in manufacturer quality control process - Pitot static system components		٧				
365		Flaws in aircraft system maintenance process definition - Pitot static systems components		٧				
366		Lack of adherence to SOP for take-off procedure in terms of speed bug checklist preparation and verification.					V	
367		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ADI		V				
368		Flaws in manufacturer quality control process - ADI		٧				
369		Flaws in aircraft system maintenance process definition - ADI		V				
370		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ASI		V				
371		Flaws in manufacturer quality control process - ASI		٧				
372		Flaws in aircraft system maintenance process definition - ASI		٧				
373		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PFD		V				
374		Flaws in manufacturer quality control process - PFD		٧				
375		Flaws in aircraft system maintenance process definition - PFD		V				
376		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine fuel distribution system		V			_ 	
377		Flaws in manufacturer quality control process - Engine fuel distribution system		٧				
378		Flaws in aircraft system maintenance process definition - Engine fuel distribution system		٧				
379		Unintuitive and / or error prone system manual - fire extinguishing system		٧			_ 	



	Safety Performance	Ducasiyaaya		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
380		Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications	V					
381		Late activation of pedal braking or takeover from autobrake, when so required		V				٧
382		Delayed selection of reverse thrust		V				V
383		Inappropriate selection of autobrake mode for given runway length and condition		V				V
384		Lack of adherence to SOP in terms of requested information support for other aircraft in terms of adverse weather conditions		V				
385		Lack of adherence to SOP in terms of application of findings from weather report		V				
386		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment	V					
387		Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations					V	
388		Flight below maneuvering speeds		V				
389		Poor application of T/O & RTO procedure, braking initiation sequence					V	
390		Incorrect weather report obtained by the flight crew		V				
391		Lack of adherence of passengers to the recommendation: Fasten seat belt while seated		V				
392		Lack of adherence to SOP in terms of "fasten your seat belt" information activation in passenger cabin during flight in turbulence conditions		V				
393		Lack of adherence to emergency procedures - recovery from severe FCS failure		V				
394		Unintuitive and / or error prone system manual - On-board weather radar.		V				
395		Incorrect use of automation - On-board weather radar		V				
396		Inadequate airline / regulatory provider policy in terms of aware of the risks related to air travel		V				
397		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - On-board weather radar		V				
398		Flaws in manufacturer quality control process - On-board weather radar		V				
399		Flaws in aircraft system maintenance process definition - On-board weather radar		٧				
400		Flaws in aircraft system maintenance process definition - stickshaker		٧			٧	
401		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - stickshaker system components		V			V	
402		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment					V	
403		Lack of adherence to SOP in terms of awareness on supporting systems warning - stickshaker		٧			V	
404		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.					٧	



	Safety Performance	Decompose		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
405		Lack of adherence to SOP in terms of providing flight crew with current weather report		٧				
406		Lack of adherence to the current technology standards in terms of flight safety and efficiency - fuel tank allocation.		V				
407		Lack of adherence to SOP in terms of AFM limitations in terms of weigh and balance		V				
408		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Rudder components.		V				
409		Flaws in aircraft system maintenance process definition - Rudder components.		V			ļ	
410		Flaws in manufacturer quality control process - Rudder components.		V				
411		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Horizontal stabilizer components.		V				
412		Flaws in aircraft system maintenance process definition - Horizontal stabilizer components.		V				
413		Flaws in manufacturer quality control process - Horizontal stabilizer components.		V				
414		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Thrust reverse system in the engine.		V				
415		Flaws in manufacturer quality control process - Thrust reverse system in the engine.		V				
416		Flaws in aircraft system maintenance process definition - Thrust reverse system in the engine.		٧				
417		Inadequate crosswind landing / decrab technique						V
418		Touchdown off centerline						٧
419		Inappropriate use of differential reverse thrust						٧
420		Lack of adherence to SOP in terms of pre-flight inspections - cargo securing quality		V				
421		Inadequate use of differential braking						٧
422		Use of nose wheel steering tiller during rollout						٧
423		Lack of adherence to SOP in terms of awareness on supporting systems (warning) - RIMCAS.	٧					
424		Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing					V	
425		Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.					V	
426		Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT)					٧	
427		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - antiice fluid HOT					V	
428		Applied de-icing / anti-icing method is not sufficient for predicted conditions					٧	
429		Error in calculation of necessary amount of fuel		٧				٧
430		Lack of adherence to SOP in terms of load sheet preparation and verification		V			_ 	



	Safety Performance	December		Ор	eration	al issu	<u> </u>	
No.	Indicators	Precursors	1	2	3	4	5	6
431		Poor application of T/O & RTO procedure, computation of T/O parameters					V	
432		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components		V				
433		Flaws in aircraft system maintenance process definition - Aircraft door system and / or components		V				
434		Long / floating flare						٧
435		Lack of adherence to ICAO Annex 14 and related documents in terms of airside lights distribution	V					
436		Lack of adherence to ICAO Annex 14 and related documents in terms of nonrestricted view on airsite from TWR	V					
437		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of Runway Conflict Warning System.	V					
438		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - RCWS	V					
439		Lack of adherence to the SOP in terms of critical maneuvre execution - flare		V				
440		Extreme operation condition / poor maintenance quality / advanced life lenght		V				
441		Failure to arm ground-spoilers		V				V
442		Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain)			V			
443		Premature descent to DA(H) before G/S intercept or premature descent to MDA(H) before final-descent-point / FAF			V			
444		Premature descent below MDA(H) before reaching the visual-descent-point (VDP)			V			
445		Flight below desired flight path during initial and/or final approach			V			
446		Continued approach, when below DA(H) or MDA(H), after loss of visual references			V			
447		Late or inadequate response to MSAW warning			V			
448		Failure to go-around, when so required			V			
449		Failure to follow published missed-approach procedure			V			
450		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of MSAW system.			V			
451		Lack of adherence to emergency procedures - flight deck smoke procedure		V				
452		Lack of adherence to AFM in terms of emergency procedures - windshear recovery		٧				
453		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MSAW System			V			
454		Lack of adherence to the current technology standards in terms of flight safety and efficiency - engines location.		٧				
455		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. MSAW warning.			V			
456		Flaws in manufacturer quality control process - CPCS system and / or components		V				



	Safety Performance	Precursors		Ор	eration	al issu	e	
No.	Indicators	PIECUISOIS	1	2	3	4	5	6
457		Flaws in aircraft system maintenance process definition - CPCS system and / or components		V				
458		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - CPCS system and / or components		V				
459		Incorrect use of automation - CPCS		V				
460		Inadequate stall recovery procedure for the aircraft	V				٧	
461		Late thrust reduction or power-on touchdown		V				V
462		Use of non-standard phraseology by pilot flying (PF) and/or pilot not flying (PNF)		V				
463		Lack of adherence to SOP in terms of necessary amount of fuel		V				V
464		Lack of adherence to AFM in terms of emergency procedures - engine failure		٧				
465		Flaws in manufacturer quality control process - TOCW system components					٧	
466		Lack of adherence to SOP for approach and landing		V				
467		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment		V				
468		Flaws in manufacturer quality control process - Stickshaker system components					٧	
469		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ACAS system components				V		
470		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS			V			
471		Inappropriate visual avoidance maneuver				٧		
472		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ACAS installed on aircraft.				V		
473		Late or inadequate response to ACAS warning				V		
474		Taxiing without clearance		V				
475		Flaws in aircraft system maintenance process definition - GPWS system components			V			
476		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - GPWS system components			V			
477		Flaws in manufacturer quality control process - GPWS system components			V			
131	A proper means to identify future risks is set-up and altered when deemed necessary	Pilot tiredness - Inadequate workload distribution	V	V	V	V	٧	٧
132		Flaws in pilot requirements definition process and/or training methodology	V	V	V	٧	٧	V
133		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	V	V	V	V	٧	V



	Safety Performance	Precursors		Ор	eration	al issu	е	
No.	Indicators	Precuisois	1	2	3	4	5	6
134		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	V	V	V	V	٧	V
135		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	V	V	V	V	V	V
136		Traffic controller tiredness - Inadequate workload distribution	V	V	V	V	٧	V
137		Flaws in traffic controller requirements definition process and/or training methodology	V	V	V	V	٧	V
138		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		V			V	V
139		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.		V			V	V
140		Lack of adherence to SOP in terms of approach and landing		V	V			V
141		Lack of English proficiency	V	V	V	V	٧	
142		Lack of or poor communication quality	V		V	V	٧	
143		Unintuitive and / or error prone system manual - CPCS		V			V	V
144		Use of non-standard phraseology by pilot and/or controller	V	V	V	V	٧	
145		Lack of adherence to the SOP in terms of critical indicators cross-checking		V	V			
146		Flaws in CRM training procedures		V	V		٧	٧
147		Lack of adherence to the main CRM rules		V	V		٧	V
148		Incorrect use of automation - FMS		V	V			V
149		Unintuitive and / or error prone system manual - FMS		V	V			V
150		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	V		V	٧	٧	
151		Aggressive maneuvering / overcontrolling		V				٧
152		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring		V			٧	V
153		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		V			٧	V
154		Inadequate aircraft de-icing / anti-icing		V			٧	
155		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components		V			V	
156		Flaws in manufacturer quality control process - Engine systems and / or components		V			V	
157		Incorrect or confusing / misleading ATC instructions	V	V	V	٧	٧	
158		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).		V	V			V
159		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)		V	V	V	V	



	Safety Performance	Precursors		Operational issue					
No.	Indicators	Precursors	1	2	3	4	5	6	
160		Flaws in aircraft system maintenance process definition - Fuel system compoonents		V					
161		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fuel system components		V					
162		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)		V	V	V	V		
163		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)		V	V	V	٧		
164		Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing		V				V	
165		Lack of adherence to SOP in terms of de-icing / anti-icing procedures.		V			٧		
166		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.		V	V			V	
167		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components			V	V	V		
168		Flaws in manufacturer quality control process - Onboard navigational systems and components.			V	V	٧		
169		Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather.		V				V	
170		Current airport diagram not reflecting critical changes	V		V				
171		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Integrity of primary aircraft structure.		V					
172		Flaws in manufacturer quality control process - Integrity of primary aircraft structure.		V					
173		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path		V				V	
174		Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.		V					
175		Lack of adherence to emergency procedures - control recovery		V				V	
176		Altimeter setting error			V	V			
177		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.		V			V		
178		Flaws in aircraft system maintenance process definition - Components of Wing control surface system.		V			٧		
179		Flaws in manufacturer quality control process - Components of Wing control surface system.		V			٧		
180		Lack of adherence to SARPs in terms of avoiding adverse weather conditions during flight		V					
181		Lack of adherence to SOP in terms of AFM limitations		V					
182		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					٧		
183		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components		V			V		
184		Flaws in aircraft system maintenance process definition - APU systems and / or components		V			٧		



	Safety Performance	Precursors		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
185		Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure		V				V
186		Flaws in manufacturer quality control process - Fuel system components.		V				
187		Flaws in aircraft system maintenance process definition - Landing gear components.		V				
188		Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.	V				V	
189		Flaws in manufacturer quality control process - Landing gear components.		V				
190		Flaws in aircraft system maintenance process definition - Engine systems and / or components		V			V	
191		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine anti-ice systems and / or components		V				
192		Flaws in manufacturer quality control process - Engine anti-ice system and / or components		V				
193		Flaws in aircraft system maintenance process definition - Engine anti-ice system and / or components		V				
194		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.			V	V	V	
195		Lack of adherence to SOP for GND movements.	V	V				
196		Hearback ommitted	V			V		
197		Incorrect use of automation -Engine anti-ice system		٧				
198		Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination		V	V			
199		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Reduction gear in the engine		V				
200		Flaws in manufacturer quality control process - Reduction gear in the engine.		V				
201		Flaws in aircraft system maintenance process definition - Reduction gear in the engine.		٧				
202		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence	٧				V	
203		Inadequate de-icing method applied		V				
204		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Compressor in the engine		V				
205		Flaws in manufacturer quality control process - Compressor in the engine.		V				
206		Flaws in aircraft system maintenance process definition - Compressor in the engine.		V				
207		Flaws in manufacturer quality control process - Engine accessory drive components.		V				
208		Flaws in aircraft system maintenance process definition - Engine accessory drive components.		V				
209		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine accessory drive components.		V				



	Safety Performance	Precursors		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
210		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ECAM (or similar) system components.		V				
211		Lack of adherence to Rules of the Air - adherence to Controller clearance				V	V	
212		Lack of adherence to emergency procedures - Fuel starvation		V				
213		Flaws in aircraft system maintenance process definition - Oil distribution system		V				
214		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Oil distribution system		V				
215		Flaws in manufacturer quality control process - Oil distribution system		V				
216		Flaws in manufacturer quality control process - APU systems and / or components		V			٧	
217		Flaws in manufacturer quality control process - Fire extinguishing system components		V		V	٧	
218		Flaws in aircraft system maintenance process definition - ECAM (or similar) system components.		V				
219		Unintuitive and / or error prone system manual - Engine anti-icing system		V				
220		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ECAM.		V				
221		Flaws in manufacturer quality control process - ECAM (or similar) system components.		V				
222		Flaws in Airspace and Air Traffic planning procedures design process				V	٧	
223		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity	V				V	
224		Flaws in aircraft system maintenance process definition - Electrical wiring System		V			٧	
225		Flaws in aircraft system maintenance process definition - Engine combustor		V				
226		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine combustor		٧				
227		Flaws in manufacturer quality control process - Engine combustor		V				
228		Flaws in aircraft system maintenance process definition - Engine turbine components		V				
229		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine turbine components		٧				
230		Flaws in manufacturer quality control process - Engine turbine components		V				
231		Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.					٧	
232		Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.					V	
233		Incorrect stab-trim setting	_				٧	
234		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS)			٧			



	Safety Performance	Drocursors		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
235		Failure to check navigation accuracy before approach			V			
236		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. Navigational aid failure.	1		V			
237		Not recognized ground Navaids System failure not reflected in NOTAM messages			V			
238		High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,)		V				V
239		Late deceleration and configuration set-up for approach and landing		V				V
240		Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS)	İ		V			1
241		Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS)			V			
242		Inadvertent deviation from cleared taxi route	V					
243		Lack of adherence to SOP for AIR operations in terms of controller error in approach clearence instruction			V			
244		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components		V			V	
245		Flaws in aircraft system maintenance process definition - Hydraulic System		V			V	
246		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.	1			V	٧	
247		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.				٧	٧	
248		Flaws in manufacturer quality control process - Communication equipment systems and components.				V	V	
249		Tactical or / and Planning Controller tiredness - Inadequate workload distribution				V		
250		Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology				V		
251		Navigation deviation				٧	٧	
252		Poor application of T/O & RTO procedure, aircraft handling					V	
253		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum		٧			٧	٧
254		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components		V			٧	
255		Takeoff without clearance	V				٧	
256		Landing without clearance	V		_		V	
257		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake)	V				V	
258		Poor application of T/O & RTO procedure, failure recognition and preparedness					٧	
259		Flaws in aircraft system maintenance process definition - Fire detection system components		V			٧	



	Safety Performance	Ducasinos		Op	eration	al issu	е	
No.	Indicators	Precursors	1	2	3	4	5	6
260		Flaws in manufacturer quality control process - Fire detection system components		V			٧	
261		Flaws in aircraft system maintenance process definition - Fire warning system		V			٧	
262		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system		٧			V	
263		Flaws in manufacturer quality control process - Fire warning system		V			٧	
264		Lack of adherence to AFM limitations for Take-off		V			٧	
265		Inadequate coordination between ATM centers and/or ATC sectors				V		
266		Unstabilized final approach (high, fast, steep,)		V				٧
267		Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	V				٧	
268		Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	V				V	
269		Difference indications of independent aircraft speed / altitude or attitude indicators		V				
270		Inadequate maintenance of fire vulnerable aircraft parts or components		V				
271		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements in terms of fire resistance		٧				
272		Lack of adherence to regulations concerning transport of DGR goods		V				
273		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Electrical / wiring system components		٧				
274		Flaws in manufacturer quality control process - Electrical / wiring systems components		V				
275		Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications	V				V	
276		Unintuitive and / or error prone system manual - FMC					٧	<u> </u>
277		Lack of adherence to SOP in terms of fuelling procedure		V				
278		Undetected incorrect takeoff configuration					٧	
279		Unintuitive and / or error prone system manual - communication equipment.				٧		
280		Altitude deviation				V		
281		Level bust (pilot lapse or late re-clearance by ATC)				V		
282		Flaws in conflict and separation minima infringement detection / elimination procedures				V		
283		Lack of adherence of airlines to time contraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data.				٧		
284		Incorrect use of communication equipment				V		
285		Separation of structural element / component of the aircraft during take-off or landing		٧				



	Safety Performance	Drocursors		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
286		Lack of adherence to engine limitations		V				
287		Failure to remember / assess crosswind component limit for prevailing runway condition					٧	٧
288		Failure to comply with an altitude or speed restriction / constraint				V		
289		Deviation from flight trajectory commanded by controller				V		
290		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Anti-icing system components		V				
291		Lack of adherence to SOP for take-off procedure in terms of altimeter callibration.				٧		
292		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MTCD System				V		
293		Lack of adherence of airlines to declared Flight Plan.				V		<u> </u>
294		Failure to identify the pre-tactical conflict before it reach the tactical controller				V		
295		Lack of adherence to SOP for Airborne operation in terms of minimum seprataion				V		
296		Military activity in controlled airport or located within controlled area				V		
297		General aviation activity in controlled airport or located within controlled area				V		
298		Intensified traffic related to general aviation activity e.g. over GA airport / airfield				V		
299		Excessive pitch attitude		٧				
300		Excessive bank angle		٧				
301		Flaws in manufacturer quality control process - Anti-icing system components		V				
302		Flaws in aircraft system maintenance process definition - Anti-icing systems components		V				
303		DME / ILS DME confusion in assessing the final descent point / FAF		V				٧
304		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components		٧			V	
305		Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling		٧			٧	
306		Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared		V				٧
307		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System.		V				٧
308		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of fire detection / warning or / and extinguishing system.		٧				
309		Flaws in manufacturer quality control process - Power supply system components		V			٧	
310		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system		V				V
311		Lack of adherence to AFM in terms of emergency procedures - stall recovery		V			٧	L



	Safety Performance	Durantenana		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
312		Flaws in manufacturer quality control process - PWS system components		V				٧
313		Imbalanced and inaproppriate relation between cpt and his subordinates			V			
314		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.		V				V
315		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - LLWAS system		V				V
316		Flaws in aircraft system maintenance process definition - Fire extinguishing system components		V			V	
317		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components					٧	
318		Callsign confusion	V				<u> </u>	
319		Unintuitive and / or error prone system manual - ground radar.	٧				V	
320		Lack of adherence to SOP in terms of aircraft icing (condition) monitoring		V			٧	
321		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FCS system or components		V			V	
322		Flaws in manufacturer quality control process - FCS system components		V			V	
323		Flaws in aircraft system maintenance process definition - FCS systems or components		V			V	
324		Lack of adherence to SOP in terms of ATCO and approach or ground controller communication	V					
325		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground Radar	V					
326		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ground radar at the airport.	V					
327		Lack of adherence to SOP in terms of awareness on supporting systems (warning) - ground radar.	V					
328		Late rejected takeoff decision / initiation					٧	
329		Descent above desired descent profile		V				V
330		Lack of adherence to AFM limitations for landing		V				V
331		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine		V			٧	
332		Flaws in manufacturer quality control process - Autothrottle system in the engine.		V			V	
333		Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.		٧			٧	
334		Lack of adherence to AFM in terms of emergency procedures - engine restart procedure		٧				
335		Lack of adherence to SOP in terms of awareness on supporting systems warning		٧				
336		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment	V					



	Safety Performance	Dura susua se		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
337		Unintuitive and / or error prone system manual - ECAM		٧				
338		Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations					٧	
339		Tailwind component above limit						٧
340		Flaws in manufacturer quality control process - Engine sensors		V				
341		Flaws in aircraft system maintenance process definition - Engine sensors		٧				
342		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine sensors		V				
343		Lack of adherence to emergency procedures - WEM		V				V
344		Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.		V			٧	
345		Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT)		V			>	
346		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - antiice fluid HOT		V			V	
347		Lack of adherence to SOP in terms of safety best practices		V				
348		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ADI system components		V		V	<u> </u>	
349		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of STCA System.				V		
350		Lack of adherence to regulations concerning independent ATCO monitoring				٧		
351		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - STCA System				V		
352		Lack of adherence to AFM in terms of emergency procedures - fire detection and extinguishing procedure		V				
353		Lack of adherence to SOP for GND movements. Poor execution of parking / docking /pushback procedure	V					
354		Go-around attempt after thrust reversers deployment		V				V
355		Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing		V			٧	
356		Flaws in aircraft system maintenance process definition - ADI system components		V				
357		Flaws in manufacturer quality control process - ADI system components		V				
358		Slow rotation (i.e., low pitch rate)					٧	
359		Lack of adherence to emergency procedures - RWY collision avoidance	V					
360		Incorrect use of automation - TOCW System					٧	
361		Flaws in aircraft system maintenance process definition - TOCW System					٧	
362		Unintuitive and / or error prone system manual - TOCW					V	



	Safety Performance	Ducasiyaaya		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
363		Inadequate effectivenes of fire extinguishing system		V				
364		Lack of adherence to the SOP in terms of critical maneuvre execution		V				
365		Applied de-icing / anti-icing method is not sufficient for predicted conditions		V			٧	
366		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System					V	
367		Incorrect use of automation - Anti-icing system		V				
368		Unintuitive and / or error prone system manual - Anti-icing system		V				
369		Lack of adherence to SOP in terms of pre-flight inspections -presence of anti-contamination covers on pitot static tube		V				
370		Lack of adherence to SOP in terms of briefing and checklist before initiating of start of taxiing and take-off		V				
371		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Pitot static system components		٧				
372		Flaws in manufacturer quality control process - Pitot static system components		V				
373		Flaws in aircraft system maintenance process definition - Pitot static systems components		V				
374		Lack of adherence to SOP for take-off procedure in terms of speed bug checklist preparation and verification.					٧	
375		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ADI		٧				
376		Flaws in manufacturer quality control process - ADI		V				
377		Flaws in aircraft system maintenance process definition - ADI		V				
378		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ASI		٧				
379		Flaws in manufacturer quality control process - ASI		V				
380		Flaws in aircraft system maintenance process definition - ASI		V				
381		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PFD		٧				
382		Flaws in manufacturer quality control process - PFD		V				
383		Flaws in aircraft system maintenance process definition - PFD		V				
384		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine fuel distribution system		٧				
385		Flaws in manufacturer quality control process - Engine fuel distribution system		٧				
386		Flaws in aircraft system maintenance process definition - Engine fuel distribution system		٧				
387		Unintuitive and / or error prone system manual - fire extinguishing system		٧				



	Safety Performance	Precursors		Op	eration	al issu	e	
No.	Indicators	PIECUISOIS	1	2	3	4	5	6
388		Flaws in aircraft system maintenance process definition - stickshaker		V	V		V	
389		Late activation of pedal braking or takeover from autobrake, when so required		V				V
390		Delayed selection of reverse thrust		V				٧
391		Inappropriate selection of autobrake mode for given runway length and condition		V				V
392		Poor application of T/O & RTO procedure, braking initiation sequence					٧	
393		Lack of adherence to SOP in terms of requested information support for other aircraft in terms of adverse weather conditions		V				
394		Lack of adherence to SOP in terms of application of findings from weather report		V				
395		Lack of adherence to SOP in terms of AFM limitations in terms of weigh and balance		V				
396		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - stickshaker system components		٧			V	
397		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment					V	
398		Flight below maneuvering speeds		V				
399		Lack of adherence to SOP in terms of awareness on supporting systems warning - stickshaker		V			V	
400		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.	ļ				٧	
401		Incorrect weather report obtained by the flight crew		V				
402		Lack of adherence to SOP in terms of providing flight crew with current weather report		V				
403		Lack of adherence of passengers to the recommendation: Fasten seat belt while seated	ļ	V				
404		Lack of adherence to SOP in terms of "fasten your seat belt" information activation in passenger cabin during flight in turbulence conditions		V				
405		Lack of adherence to SOP in terms of load sheet preparation and verification		V				
406		Lack of adherence to the current technology standards in terms of flight safety and efficiency - fuel tank allocation.		V				
407		Lack of adherence to emergency procedures - recovery from severe FCS failure		٧				
408		Flaws in airport capacity management process					٧	
409		Unintuitive and / or error prone system manual - On-board weather radar.		V				
410		Incorrect use of automation - On-board weather radar		٧				
411		Lack of adherence to SOP for take-off procedure in terms of time limitation for take-off preparation.					٧	
412		Inadequate airline / regulatory provider policy in terms of aware of the risks related to air travel		٧				
413		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - On-board weather radar		٧				



	Safety Performance	D		Op	eration	al issu		
No.	Indicators	Precursors	1	2	3	4	5	6
414		Flaws in manufacturer quality control process - On-board weather radar		٧				
415		Flaws in aircraft system maintenance process definition - On-board weather radar		V			1	
416		Poor application of T/O & RTO procedure, computation of T/O parameters					V	
417		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Rudder components.		٧				
418		Flaws in aircraft system maintenance process definition - Rudder components.		V			<u> </u>	
419		Flaws in manufacturer quality control process - Rudder components.		V			1	
420		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Horizontal stabilizer components.		٧				
421		Flaws in aircraft system maintenance process definition - Horizontal stabilizer components.		V				
422		Flaws in manufacturer quality control process - Horizontal stabilizer components.		V			1	
423		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Thrust reverse system in the engine.		٧				
424		Flaws in manufacturer quality control process - Thrust reverse system in the engine.		V			1	
425		Flaws in aircraft system maintenance process definition - Thrust reverse system in the engine.		V			1	
426		Inadequate crosswind landing / decrab technique						٧
427		Touchdown off centerline					1	٧
428		Inappropriate use of differential reverse thrust						٧
429		Lack of adherence to SOP in terms of pre-flight inspections - cargo securing quality		V				
430		Inadequate use of differential braking						٧
431		Use of nose wheel steering tiller during rollout						٧
432		Lack of adherence to SOP in terms of awareness on supporting systems (warning) - RIMCAS.	V					
433		Error in calculation of necessary amount of fuel		٧				٧
434		Lack of adherence to SOP in terms of pre-flight inspections - ice presence on aircraft		V				
435		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components		٧				
436		Flaws in aircraft system maintenance process definition - Aircraft door system and / or components		٧				
437		Long / floating flare						٧
438		Flaws in manufacturer quality control process - CPCS system and / or components		٧				
439		Flaws in aircraft system maintenance process definition - CPCS system and / or components		V				



	Safety Performance	December		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
440		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - CPCS system and / or components		V				
441		Lack of adherence to ICAO Annex 14 and related documents in terms of airside lights distribution	V					
442		Lack of adherence to ICAO Annex 14 and related documents in terms of nonrestricted view on airsite from TWR	V					
443		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of Runway Conflict Warning System.	V					
444		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - RCWS	V					
445		Lack of adherence to TO procedure in terms of antiice protection		V				
446		Flaws in manufacturer quality control process - anti-ice fluid specifications (HOT)		V				
447		Lack of adherence to emergency procedures - flight deck smoke procedure		V				
448		Lack of adherence to the SOP in terms of critical maneuvre execution - flare		V				
449		Extreme operation condition / poor maintenance quality / advanced life lenght		V				
450		Incorrect use of automation - CPCS		V				
451		Failure to arm ground-spoilers		V				٧
452		Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain)			V			
453		Premature descent to DA(H) before G/S intercept or premature descent to MDA(H) before final-descent-point / FAF			V			
454		Premature descent below MDA(H) before reaching the visual-descent-point (VDP)			V			
455		Flight below desired flight path during initial and/or final approach			V			
456		Continued approach, when below DA(H) or MDA(H), after loss of visual references			V			
457		Late or inadequate response to MSAW warning			V			
458		Failure to go-around, when so required			V			
459		Failure to follow published missed-approach procedure			V			
460		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of MSAW system.			V			
461		Lack of adherence to AFM in terms of emergency procedures - windshear recovery		٧				
462		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MSAW System			V			
463		Lack of adherence to the current technology standards in terms of flight safety and efficiency - engines location.		٧				
464		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. MSAW warning.			V			
465		Inadequate stall recovery procedure for the aircraft	٧				V	



	Safety Performance	Duaniusaus		Ор	eration	al issu	е	
No.	Indicators	Precursors	1	2	3	4	5	6
466		Late thrust reduction or power-on touchdown		V				٧
467		Use of non-standard phraseology by pilot flying (PF) and/or pilot not flying (PNF)		V				
468		Lack of adherence to SOP in terms of necessary amount of fuel		V				V
469		Flaws in manufacturer quality control process - Stickshaker system components		V			٧	
470		Lack of adherence to AFM in terms of emergency procedures - engine failure		٧				
471		Inadequate management / separation of takeoffs and landings	V					
472		Flaws in manufacturer quality control process - TOCW system components					٧	
473		Lack of adherence to SOP for approach and landing		V				
474		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment		V				
475		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ACAS system components				V		
476		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS			V			
477		Inappropriate visual avoidance maneuver				V		
478		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ACAS installed on aircraft.				V		
479		Late or inadequate response to ACAS warning				V		
480		Taxiing without clearance		V				
481		Flaws in aircraft system maintenance process definition - GPWS system components			V			
482		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - GPWS system components			V			
483		Flaws in manufacturer quality control process - GPWS system components			٧			
131	Future risk are identified on a regular basis (at least each year new risks should be identified) using a dedicated means to do so	Pilot tiredness - Inadequate workload distribution	V	V	٧	٧	V	V
132		Flaws in pilot requirements definition process and/or training methodology	V	٧	V	V	V	٧
133		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	V	٧	V	V	٧	٧
134		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	V	٧	V	V	٧	٧
135		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	V	V	V	V	V	٧



	Safety Performance	Dragingons		Op	eration	al issu	е	
No.	Indicators	Precursors	1	2	3	4	5	6
136		Traffic controller tiredness - Inadequate workload distribution	V	V	V	V	٧	V
137		Flaws in traffic controller requirements definition process and/or training methodology	V	V	V	V	٧	V
138		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		V			V	V
139		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.		V			٧	٧
140		Lack of adherence to SOP in terms of approach and landing		V	V			V
141		Lack of English proficiency	V	V	V	V	٧	
142		Lack of or poor communication quality	٧		V	V	٧	
143		Unintuitive and / or error prone system manual - CPCS		V			٧	V
144		Use of non-standard phraseology by pilot and/or controller	٧	V	V	V	٧	
145		Lack of adherence to the SOP in terms of critical indicators cross-checking		V	V			
146		Flaws in CRM training procedures		V	٧		٧	V
147		Lack of adherence to the main CRM rules		V	V		٧	V
148		Incorrect use of automation - FMS		٧	٧			V
149		Unintuitive and / or error prone system manual - FMS		V	V			V
150		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	٧		V	V	٧	
151		Aggressive maneuvering / overcontrolling		٧				V
152		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring		V			٧	V
153		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		V			٧	V
154		Inadequate aircraft de-icing / anti-icing		٧			٧	
155		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components		V			V	
156		Flaws in manufacturer quality control process - Engine systems and / or components		V			٧	
157		Incorrect or confusing / misleading ATC instructions	V	V	V	V	٧	
158		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).		V	V			V
159		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)		V	V	V	V	
160		Flaws in aircraft system maintenance process definition - Fuel system compoonents		V				
161		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fuel system components		V				



	Safety Performance	Duranteen		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
162		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)		٧	V	٧	٧	
163		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)		٧	V	٧	V	
164		Lack of adherence to SOP in terms of de-icing / anti-icing procedures.		V			V	
165		Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing		٧			1	V
166		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.		V	V			V
167		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components			V	V	V	
168		Flaws in manufacturer quality control process - Onboard navigational systems and components.			V	V	V	
169		Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather.		V				V
170		Current airport diagram not reflecting critical changes	V		V		<u> </u>	
171		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Integrity of primary aircraft structure.		V				
172		Flaws in manufacturer quality control process - Integrity of primary aircraft structure.		٧			1	
173		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path		V				٧
174		Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.		V			<u> </u>	
175		Lack of adherence to emergency procedures - control recovery		V			<u> </u>	V
176		Altimeter setting error			V	V	1	
177		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.		V			V	
178		Flaws in aircraft system maintenance process definition - Components of Wing control surface system.		٧			V	
179		Flaws in manufacturer quality control process - Components of Wing control surface system.		V			V	
180		Lack of adherence to SARPs in terms of avoiding adverse weather conditions during flight		٧			1	
181		Lack of adherence to SOP in terms of AFM limitations		V				
182		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					V	
183		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components		٧			٧	
184		Flaws in aircraft system maintenance process definition - APU systems and / or components		٧			V	
185		Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure		٧				٧
186		Flaws in manufacturer quality control process - Fuel system components.		V	_			



	Safety Performance	Duanimanua		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
187		Flaws in aircraft system maintenance process definition - Landing gear components.		٧				
188		Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.	V				٧	
189		Flaws in manufacturer quality control process - Landing gear components.		V				
190		Flaws in aircraft system maintenance process definition - Engine systems and / or components		V			٧	
191		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine anti-ice systems and / or components		V				
192		Flaws in manufacturer quality control process - Engine anti-ice system and / or components		V				
193		Flaws in aircraft system maintenance process definition - Engine anti-ice system and / or components		V				
194		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.			V	V	V	
195		Lack of adherence to SOP for GND movements.	V	V				
196		Hearback ommitted	V			V		
197		Incorrect use of automation -Engine anti-ice system		V				
198		Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination		٧	٧			
199		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Reduction gear in the engine		V				
200		Flaws in manufacturer quality control process - Reduction gear in the engine.		V				
201		Flaws in aircraft system maintenance process definition - Reduction gear in the engine.		V				
202		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence	V				٧	
203		Inadequate de-icing method applied		V				
204		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Compressor in the engine		٧				
205		Flaws in manufacturer quality control process - Compressor in the engine.		V				
206		Flaws in aircraft system maintenance process definition - Compressor in the engine.		V				
207		Flaws in manufacturer quality control process - Engine accessory drive components.		٧				
208		Flaws in aircraft system maintenance process definition - Engine accessory drive components.		V				
209		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine accessory drive components.		٧				
210		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ECAM (or similar) system components.		V				
211		Lack of adherence to Rules of the Air - adherence to Controller clearance				V	٧	



	Safety Performance	Precursors		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
212		Lack of adherence to emergency procedures - Fuel starvation		V				
213		Flaws in aircraft system maintenance process definition - Oil distribution system		V				
214		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Oil distribution system		٧				
215		Flaws in manufacturer quality control process - Oil distribution system		V				
216		Flaws in manufacturer quality control process - APU systems and / or components		V			V	
217		Flaws in manufacturer quality control process - Fire extinguishing system components		V		V	V	
218		Flaws in aircraft system maintenance process definition - ECAM (or similar) system components.		V				
219		Unintuitive and / or error prone system manual - Engine anti-icing system		V				
220		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ECAM.		V				
221		Flaws in manufacturer quality control process - ECAM (or similar) system components.		٧				
222		Flaws in Airspace and Air Traffic planning procedures design process				V	V	
223		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity	V				V	
224		Flaws in aircraft system maintenance process definition - Electrical wiring System		V			V	
225		Flaws in aircraft system maintenance process definition - Engine combustor		V				
226		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine combustor		V				
227		Flaws in manufacturer quality control process - Engine combustor		V				
228		Flaws in aircraft system maintenance process definition - Engine turbine components		V			<u> </u>	
229		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine turbine components		V				
230		Flaws in manufacturer quality control process - Engine turbine components		V				
231		Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.					٧	
232		Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.					٧	
233		Incorrect stab-trim setting					V	
234		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS)			٧			
235		Failure to check navigation accuracy before approach			V			
236		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. Navigational aid failure.			V			



	Safety Performance	December		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
237		Not recognized ground Navaids System failure not reflected in NOTAM messages			V		l	
238		High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,)		V				V
239		Late deceleration and configuration set-up for approach and landing		V				V
240		Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS)			V		<u> </u>	
241		Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS)			V			
242		Inadvertent deviation from cleared taxi route	V					
243		Lack of adherence to SOP for AIR operations in terms of controller error in approach clearence instruction			V			
244		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components		٧			V	
245		Flaws in aircraft system maintenance process definition - Hydraulic System		V			٧	
246		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.				٧	V	
247		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.				٧	٧	
248		Flaws in manufacturer quality control process - Communication equipment systems and components.				V	٧	
249		Tactical or / and Planning Controller tiredness - Inadequate workload distribution				V		
250		Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology				٧		
251		Navigation deviation				V	V	
252		Poor application of T/O & RTO procedure, aircraft handling					V	
253		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum		٧			٧	٧
254		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components		V			٧	
255		Takeoff without clearance	V				٧	
256		Landing without clearance	V				V	
257		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake)	V				V	
258		Poor application of T/O & RTO procedure, failure recognition and preparedness					٧	
259		Flaws in aircraft system maintenance process definition - Fire detection system components		٧			V	
260		Flaws in manufacturer quality control process - Fire detection system components		٧			V	
261		Flaws in aircraft system maintenance process definition - Fire warning system		V	_		V	



	Safety Performance	Durantena		Ор	eration	al issu	е	
No.	Indicators	Precursors	1	2	3	4	5	6
262		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system		V			V	
263		Flaws in manufacturer quality control process - Fire warning system		V			V	
264		Lack of adherence to AFM limitations for Take-off		V			V	
265		Inadequate coordination between ATM centers and/or ATC sectors				V		
266		Unstabilized final approach (high, fast, steep,)		V				٧
267		Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	V				V	
268		Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	V				V	
269		Difference indications of independent aircraft speed / altitude or attitude indicators		V				
270		Inadequate maintenance of fire vulnerable aircraft parts or components		V				
271		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements in terms of fire resistance		V				
272		Lack of adherence to regulations concerning transport of DGR goods		V				
273		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Electrical / wiring system components		V				
274		Flaws in manufacturer quality control process - Electrical / wiring systems components		V				
275		Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications	V				V	
276		Unintuitive and / or error prone system manual - FMC					V	
277		Lack of adherence to SOP in terms of fuelling procedure		V			<u> </u>	
278		Undetected incorrect takeoff configuration					V	
279		Unintuitive and / or error prone system manual - communication equipment.				V		
280		Altitude deviation				V		
281		Level bust (pilot lapse or late re-clearance by ATC)				V		
282		Flaws in conflict and separation minima infringement detection / elimination procedures				V		
283		Lack of adherence of airlines to time contraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data.				V		
284		Incorrect use of communication equipment				V	<u> </u>	
285		Separation of structural element / component of the aircraft during take-off or landing		V				
286		Lack of adherence to engine limitations		V				
287		Failure to remember / assess crosswind component limit for prevailing runway condition					V	٧



	Safety Performance	Precursors		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
288		Failure to comply with an altitude or speed restriction / constraint				V		
289		Deviation from flight trajectory commanded by controller				V		
290		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Anti-icing system components		٧				
291		Lack of adherence to SOP for take-off procedure in terms of altimeter callibration.				V		
292		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MTCD System				V		
293		Lack of adherence of airlines to declared Flight Plan.				V		
294		Failure to identify the pre-tactical conflict before it reach the tactical controller				V		
295		Lack of adherence to SOP for Airborne operation in terms of minimum seprataion				V		
296		Military activity in controlled airport or located within controlled area				V		
297		General aviation activity in controlled airport or located within controlled area				V		
298		Intensified traffic related to general aviation activity e. g. over GA airport / airfield				V		
299		Excessive pitch attitude		V				
300		Excessive bank angle		٧				
301		Flaws in manufacturer quality control process - Anti-icing system components		٧				
302		Flaws in aircraft system maintenance process definition - Anti-icing systems components		٧				
303		DME / ILS DME confusion in assessing the final descent point / FAF		V				٧
304		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components		٧			V	
305		Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling		V			V	
306		Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared		V				٧
307		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System.		V				٧
308		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of fire detection / warning or / and extinguishing system.		٧				
309		Flaws in manufacturer quality control process - Power supply system components		V			V	
310		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system		٧				٧
311		Lack of adherence to AFM in terms of emergency procedures - stall recovery		V			V	
312		Flaws in manufacturer quality control process - PWS system components		٧				٧
313		Imbalanced and inaproppriate relation between cpt and his subordinates			V			1



	Safety Performance	Precursors		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
314		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.		V				V
315		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - LLWAS system		V				٧
316		Flaws in aircraft system maintenance process definition - Fire extinguishing system components		V			V	
317		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components					V	
318		Callsign confusion	V					
319		Unintuitive and / or error prone system manual - ground radar.	V				V	
320		Lack of adherence to SOP in terms of aircraft icing (condition) monitoring		V			٧	1
321		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FCS system or components		V			V	
322		Flaws in manufacturer quality control process - FCS system components		V			V	
323		Flaws in aircraft system maintenance process definition - FCS systems or components		V			٧	
324		Lack of adherence to SOP in terms of ATCO and approach or ground controller communication	V					1
325		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground Radar	V					
326		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ground radar at the airport.	V					
327		Lack of adherence to SOP in terms of awareness on supporting systems (warning) - ground radar.	V					
328		Late rejected takeoff decision / initiation					٧	
329		Descent above desired descent profile		V				٧
330		Lack of adherence to AFM limitations for landing		V				٧
331		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine		V			V	
332		Flaws in manufacturer quality control process - Autothrottle system in the engine.		V			٧	
333		Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.		V			٧	
334		Lack of adherence to AFM in terms of emergency procedures - engine restart procedure		V				
335		Lack of adherence to SOP in terms of awareness on supporting systems warning		V				
336		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment	V					
337		Unintuitive and / or error prone system manual - ECAM		V				
338		Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations					٧	



	Safety Performance	Precursors		Ор	eration	al issu	2	
No.	Indicators	Precursors	1	2	3	4	5	6
339		Tailwind component above limit						٧
340		Flaws in manufacturer quality control process - Engine sensors		V				
341		Flaws in aircraft system maintenance process definition - Engine sensors		٧				
342		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine sensors		V				
343		Lack of adherence to emergency procedures - WEM		V				V
344		Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.		V			V	<u> </u>
345		Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT)		V			V	
346		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - antiice fluid HOT		V			V	
347		Lack of adherence to SOP in terms of safety best practices		V				
348		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ADI system components		V		V		
349		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of STCA System.				V		
350		Lack of adherence to regulations concerning independent ATCO monitoring				٧		
351		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - STCA System				V		
352		Lack of adherence to AFM in terms of emergency procedures - fire detection and extinguishing procedure		V				
353		Lack of adherence to SOP for GND movements. Poor execution of parking / docking /pushback procedure	V					
354		Go-around attempt after thrust reversers deployment		V				٧
355		Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing		٧			٧	
356		Flaws in aircraft system maintenance process definition - ADI system components		٧				
357		Flaws in manufacturer quality control process - ADI system components		V				
358		Slow rotation (i.e., low pitch rate)					V	
359		Lack of adherence to emergency procedures - RWY collision avoidance	V					
360		Incorrect use of automation - TOCW System					٧	
361		Flaws in aircraft system maintenance process definition - TOCW System					٧	
362		Unintuitive and / or error prone system manual - TOCW					٧	
363		Inadequate effectivenes of fire extinguishing system		٧				
364		Lack of adherence to the SOP in terms of critical maneuvre execution		٧				



	Safety Performance	Precursors		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
365		Applied de-icing / anti-icing method is not sufficient for predicted conditions		V			V	1
366		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System					٧	
367		Incorrect use of automation - Anti-icing system		V				
368		Unintuitive and / or error prone system manual - Anti-icing system		V				
369		Lack of adherence to SOP in terms of pre-flight inspections -presence of anti-contamination covers on pitot static tube		V				
370		Lack of adherence to SOP in terms of briefing and checklist before initiating of start of taxiing and take-off		V				
371		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Pitot static system components		٧				
372		Flaws in manufacturer quality control process - Pitot static system components		V				
373		Flaws in aircraft system maintenance process definition - Pitot static systems components		V				
374		Lack of adherence to SOP for take-off procedure in terms of speed bug checklist preparation and verification.					V	
375		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ADI		٧				
376		Flaws in manufacturer quality control process - ADI		V				
377		Flaws in aircraft system maintenance process definition - ADI		V				
378		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ASI		٧				
379		Flaws in manufacturer quality control process - ASI		V				
380		Flaws in aircraft system maintenance process definition - ASI		V				
381		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PFD		٧				
382		Flaws in manufacturer quality control process - PFD		V				
383		Flaws in aircraft system maintenance process definition - PFD		V				
384		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine fuel distribution system		٧				
385		Flaws in manufacturer quality control process - Engine fuel distribution system		V				
386		Flaws in aircraft system maintenance process definition - Engine fuel distribution system		٧				
387		Unintuitive and / or error prone system manual - fire extinguishing system		٧				
388		Flaws in aircraft system maintenance process definition - stickshaker		٧	V		٧	
389		Late activation of pedal braking or takeover from autobrake, when so required		V				٧



	Safety Performance	Ducassus		Op	eration	al issue	9	
No.	Indicators	Precursors	1	2	3	4	5	6
390		Delayed selection of reverse thrust		٧				V
391		Inappropriate selection of autobrake mode for given runway length and condition		٧				٧
392		Poor application of T/O & RTO procedure, braking initiation sequence					٧	
393		Lack of adherence to SOP in terms of requested information support for other aircraft in terms of adverse weather conditions		V				
394		Lack of adherence to SOP in terms of application of findings from weather report		V				
395		Lack of adherence to SOP in terms of AFM limitations in terms of weigh and balance		٧				
396		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - stickshaker system components		V			V	
397		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment					٧	<u> </u>
398		Flight below maneuvering speeds		V				<u> </u>
399		Lack of adherence to SOP in terms of awareness on supporting systems warning - stickshaker		٧			٧	
400		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.					٧	
401		Incorrect weather report obtained by the flight crew		٧				
402		Lack of adherence to SOP in terms of providing flight crew with current weather report		٧				
403		Lack of adherence of passengers to the recommendation: Fasten seat belt while seated		٧				
404		Lack of adherence to SOP in terms of "fasten your seat belt" information activation in passenger cabin during flight in turbulence conditions		V				
405		Lack of adherence to SOP in terms of load sheet preparation and verification		٧				<u> </u>
406		Lack of adherence to the current technology standards in terms of flight safety and efficiency - fuel tank allocation.		V				
407		Lack of adherence to emergency procedures - recovery from severe FCS failure		٧				
408		Flaws in airport capacity management process					٧	
409		Unintuitive and / or error prone system manual - On-board weather radar.		٧				
410		Incorrect use of automation - On-board weather radar		٧				<u> </u>
411		Lack of adherence to SOP for take-off procedure in terms of time limitation for take-off preparation.					٧	
412		Inadequate airline / regulatory provider policy in terms of aware of the risks related to air travel		V				
413		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - On-board weather radar		V				
414		Flaws in manufacturer quality control process - On-board weather radar		V				
415		Flaws in aircraft system maintenance process definition - On-board weather radar		٧				



	Safety Performance	Drocurrors		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
416		Poor application of T/O & RTO procedure, computation of T/O parameters					٧	ĺ
417		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Rudder components.		V				
418		Flaws in aircraft system maintenance process definition - Rudder components.		V				
419		Flaws in manufacturer quality control process - Rudder components.		V				Ì
420		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Horizontal stabilizer components.		V				
421		Flaws in aircraft system maintenance process definition - Horizontal stabilizer components.		V				
422		Flaws in manufacturer quality control process - Horizontal stabilizer components.		V				Ì
423		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Thrust reverse system in the engine.		V				
424		Flaws in manufacturer quality control process - Thrust reverse system in the engine.		V				
425		Flaws in aircraft system maintenance process definition - Thrust reverse system in the engine.		V				Ì
426		Inadequate crosswind landing / decrab technique						V
427		Touchdown off centerline						V
428		Inappropriate use of differential reverse thrust						V
429		Lack of adherence to SOP in terms of pre-flight inspections - cargo securing quality		V				
430		Inadequate use of differential braking						V
431		Use of nose wheel steering tiller during rollout						V
432		Lack of adherence to SOP in terms of awareness on supporting systems (warning) - RIMCAS.	V					
433		Error in calculation of necessary amount of fuel		V				V
434		Lack of adherence to SOP in terms of pre-flight inspections - ice presence on aircraft		V				
435		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components		V				
436		Flaws in aircraft system maintenance process definition - Aircraft door system and / or components		V				
437		Long / floating flare						V
438		Flaws in manufacturer quality control process - CPCS system and / or components		V				
439		Flaws in aircraft system maintenance process definition - CPCS system and / or components		V				
440		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - CPCS system and / or components		V				
441		Lack of adherence to ICAO Annex 14 and related documents in terms of airside lights distribution	V					<u> </u>



	Safety Performance	Precursors		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
442		Lack of adherence to ICAO Annex 14 and related documents in terms of nonrestricted view on airsite from TWR	V					
443		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of Runway Conflict Warning System.	V					
444		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - RCWS	V				ļ	
445		Lack of adherence to TO procedure in terms of antiice protection		V				
446		Flaws in manufacturer quality control process - anti-ice fluid specifications (HOT)		V				
447		Lack of adherence to emergency procedures - flight deck smoke procedure		V				
448		Lack of adherence to the SOP in terms of critical maneuvre execution - flare		V				
449		Extreme operation condition / poor maintenance quality / advanced life lenght		V				
450		Incorrect use of automation - CPCS		V				
451		Failure to arm ground-spoilers		V				٧
452		Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain)			V			
453		Premature descent to DA(H) before G/S intercept or premature descent to MDA(H) before final-descent-point / FAF			V			
454		Premature descent below MDA(H) before reaching the visual-descent-point (VDP)			V			
455		Flight below desired flight path during initial and/or final approach			V			
456		Continued approach, when below DA(H) or MDA(H), after loss of visual references			٧			
457		Late or inadequate response to MSAW warning			>			
458		Failure to go-around, when so required			V			
459		Failure to follow published missed-approach procedure			V			
460		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of MSAW system.			V			
461		Lack of adherence to AFM in terms of emergency procedures - windshear recovery		V				
462		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MSAW System			>			
463		Lack of adherence to the current technology standards in terms of flight safety and efficiency - engines location.		٧				
464		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. MSAW warning.			V			
465		Inadequate stall recovery procedure for the aircraft	V				٧	
466		Late thrust reduction or power-on touchdown		٧				٧
467		Use of non-standard phraseology by pilot flying (PF) and/or pilot not flying (PNF)		٧				
468		Lack of adherence to SOP in terms of necessary amount of fuel		V				V



	Safety Performance	Dracureare		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
469		Flaws in manufacturer quality control process - Stickshaker system components		V			٧	
470		Lack of adherence to AFM in terms of emergency procedures - engine failure		V				
471		Inadequate management / separation of takeoffs and landings	V					1
472		Flaws in manufacturer quality control process - TOCW system components					٧	
473		Lack of adherence to SOP for approach and landing		V				
474		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment		V				
475		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ACAS system components				V		
476		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS			٧			
477		Inappropriate visual avoidance maneuver				V		
478		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ACAS installed on aircraft.				V		
479		Late or inadequate response to ACAS warning				V		
480		Taxiing without clearance		V				
481		Flaws in aircraft system maintenance process definition - GPWS system components			V			
482		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - GPWS system components			V			
483		Flaws in manufacturer quality control process - GPWS system components			V			
131	A common risk classification framework is used by CAAs and industry (using the same criteria for likelihood and severity of events)	Pilot tiredness - Inadequate workload distribution	V	V	V	٧	٧	V
132		Flaws in pilot requirements definition process and/or training methodology	V	V	٧	V	٧	V
133		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	V	٧	V	V	V	٧
134		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	V	V	V	V	٧	V
135		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	V	٧	V	V	V	V
136		Traffic controller tiredness - Inadequate workload distribution	V	٧	V	V	٧	V
137		Flaws in traffic controller requirements definition process and/or training methodology	V	٧	٧	٧	٧	٧
138		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance		V			٧	V



	Safety Performance	Precursors		Op	Operational issue						
No.	Indicators	Precursors	1	2	3	4	5	6			
		with requirements - Landing gear components					<u> </u>				
139		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.		٧			V	V			
140		Lack of adherence to SOP in terms of approach and landing		V	V		1	V			
141		Unintuitive and / or error prone system manual - CPCS		٧			V	V			
142		Lack of English proficiency	V	V	V	V	V				
143		Lack of or poor communication quality	V		V	V	V				
144		Use of non-standard phraseology by pilot and/or controller	V	٧	V	٧	V				
145		Lack of adherence to the SOP in terms of critical indicators cross-checking		V	V						
146		Flaws in CRM training procedures		V	V		V	V			
147		Lack of adherence to the main CRM rules		V	V		V	V			
148		Incorrect use of automation - FMS		V	V			V			
149		Unintuitive and / or error prone system manual - FMS		V	V		1	V			
150		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	V		V	V	V				
151		Aggressive maneuvering / overcontrolling		V				V			
152		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring		٧			V	V			
153		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		٧			V	V			
154		Inadequate aircraft de-icing / anti-icing		V			V				
155		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components		٧			٧				
156		Flaws in manufacturer quality control process - Engine systems and / or components		V			V				
157		Incorrect or confusing / misleading ATC instructions	V	V	V	V	V				
158		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).		٧	٧			٧			
159		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)		٧	>	٧	V				
160		Flaws in aircraft system maintenance process definition - Fuel system compoonents		V			1				
161		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fuel system components		٧							
162		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)		٧	V	٧	V				
163		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)		V	V	V	V				



	Safety Performance	Decompose		Ор	eration	al issu	<u> </u>	
No.	Indicators	Precursors	1	2	3	4	5	6
164		Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing		V				٧
165		Lack of adherence to SOP in terms of de-icing / anti-icing procedures.		V			٧	
166		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.		V	V			V
167		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components			V	٧	٧	
168		Flaws in manufacturer quality control process - Onboard navigational systems and components.			V	٧	٧	
169		Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather.		V				V
170		Current airport diagram not reflecting critical changes	V		V		l	
171		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Integrity of primary aircraft structure.		V				
172		Flaws in manufacturer quality control process - Integrity of primary aircraft structure.		V				
173		Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.		V				
174		Lack of adherence to emergency procedures - control recovery		V				V
175		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path		V				V
176		Altimeter setting error			V	V		
177		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.		V			٧	
178		Flaws in aircraft system maintenance process definition - Components of Wing control surface system.		V			٧	
179		Flaws in manufacturer quality control process - Components of Wing control surface system.		V			٧	
180		Lack of adherence to SARPs in terms of avoiding adverse weather conditions during flight		V				
181		Lack of adherence to SOP in terms of AFM limitations		V				
182		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					٧	
183		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components		V			٧	
184		Flaws in aircraft system maintenance process definition - APU systems and / or components		V			٧	
185		Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure		٧				V
186		Flaws in manufacturer quality control process - Fuel system components.		V				
187		Flaws in aircraft system maintenance process definition - Landing gear components.		٧				
188		Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.	V				٧	



	Safety Performance	Ducasinosia		Ор	eration	al issue	e	
No.	Indicators	Precursors	1	2	3	4	5	6
189		Flaws in manufacturer quality control process - Landing gear components.		٧				
190		Flaws in aircraft system maintenance process definition - Engine systems and / or components		٧			٧	
191		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine anti-ice systems and / or components		٧				
192		Flaws in manufacturer quality control process - Engine anti-ice system and / or components		٧				
193		Flaws in aircraft system maintenance process definition - Engine anti-ice system and / or components		٧				
194		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.			٧	V	V	
195		Hearback ommitted	V			V		1
196		Incorrect use of automation -Engine anti-ice system		V				
197		Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination		V	٧			
198		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Reduction gear in the engine		٧				
199		Flaws in manufacturer quality control process - Reduction gear in the engine.		٧				
200		Flaws in aircraft system maintenance process definition - Reduction gear in the engine.		V				
201		Lack of adherence to SOP for GND movements.	V	V				
202		Inadequate de-icing method applied		V				
203		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Compressor in the engine		٧				
204		Flaws in manufacturer quality control process - Compressor in the engine.		V				
205		Flaws in aircraft system maintenance process definition - Compressor in the engine.		V				
206		Flaws in manufacturer quality control process - Engine accessory drive components.		V				
207		Flaws in aircraft system maintenance process definition - Engine accessory drive components.		V				
208		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine accessory drive components.		V				
209		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ECAM (or similar) system components.		٧				
210		Lack of adherence to Rules of the Air - adherence to Controller clearance				V	٧	
211		Lack of adherence to emergency procedures - Fuel starvation		٧				
212		Flaws in aircraft system maintenance process definition - Oil distribution system		٧				
213		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance		٧				



	Safety Performance	Duranina		Ор	eration	al issu	<u></u>	
No.	Indicators	Precursors	1	2	3	4	5	6
		with requirements - Oil distribution system						
214		Flaws in manufacturer quality control process - Oil distribution system		V				
215		Flaws in manufacturer quality control process - APU systems and / or components		V			>	
216		Flaws in manufacturer quality control process - Fire extinguishing system components		V		V	V	
217		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence	V				٧	
218		Flaws in aircraft system maintenance process definition - ECAM (or similar) system components.		V				
219		Unintuitive and / or error prone system manual - Engine anti-icing system		V				
220		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ECAM.		V				
221		Flaws in manufacturer quality control process - ECAM (or similar) system components.		V				
222		Flaws in Airspace and Air Traffic planning procedures design process				V	٧	
223		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity	V				V	
224		Flaws in aircraft system maintenance process definition - Electrical wiring System		V			٧	
225		Flaws in aircraft system maintenance process definition - Engine combustor		V				
226		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine combustor		V				
227		Flaws in manufacturer quality control process - Engine combustor		V				
228		Flaws in aircraft system maintenance process definition - Engine turbine components		V				
229		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine turbine components		V				
230		Flaws in manufacturer quality control process - Engine turbine components		V				
231		Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.					٧	
232		Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.					٧	
233		Incorrect stab-trim setting					V	
234		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS)			>			
235		Failure to check navigation accuracy before approach			V			
236		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. Navigational aid failure.			V			
237		Not recognized ground Navaids System failure not reflected in NOTAM messages			V			
238		High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,)		V				V



	Safety Performance	Duranteen		Operational issue 1 2 3 4 5					
No.	Indicators	Precursors	1	2	3	4	5	6	
		or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,)					<u> </u>		
239		Late deceleration and configuration set-up for approach and landing		٧			<u> </u>	V	
240		Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS)			V		<u> </u>		
241		Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS)			V		<u> </u>		
242		Inadvertent deviation from cleared taxi route	V				<u> </u>		
243		Lack of adherence to SOP for AIR operations in terms of controller error in approach clearence instruction			V				
244		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components		V			V		
245		Flaws in aircraft system maintenance process definition - Hydraulic System		V			V		
246		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.				٧	V		
247		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.				V	V		
248		Flaws in manufacturer quality control process - Communication equipment systems and components.				V	V		
249		Tactical or / and Planning Controller tiredness - Inadequate workload distribution				٧	1		
250		Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology				٧	1		
251		Navigation deviation				٧	V		
252		Poor application of T/O & RTO procedure, aircraft handling					V		
253		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum		V			٧	V	
254		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components		V			V		
255		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake)	V				V		
256		Poor application of T/O & RTO procedure, failure recognition and preparedness					V		
257		Flaws in aircraft system maintenance process definition - Fire detection system components		V			V		
258		Flaws in manufacturer quality control process - Fire detection system components		V			V		
259		Flaws in aircraft system maintenance process definition - Fire warning system		V			V		
260		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system		V			V		
261		Flaws in manufacturer quality control process - Fire warning system		V			V		
262		Takeoff without clearance	V				V		



	Safety Performance	Precursors		Ор	eration	al issu	2	
No.	Indicators	Precursors	1	2	3	4	5	6
263		Landing without clearance	V				V	
264		Lack of adherence to AFM limitations for Take-off		V			V	
265		Inadequate coordination between ATM centers and/or ATC sectors				V		
266		Unstabilized final approach (high, fast, steep,)		V				V
267		Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	V				V	
268		Difference indications of independent aircraft speed / altitude or attitude indicators		V				
269		Inadequate maintenance of fire vulnerable aircraft parts or components		V				
270		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements in terms of fire resistance		٧				
271		Lack of adherence to regulations concerning transport of DGR goods		V				
272		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Electrical / wiring system components		٧				
273		Flaws in manufacturer quality control process - Electrical / wiring systems components		V				
274		Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications	V				V	
275		Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	V				V	<u> </u>
276		Unintuitive and / or error prone system manual - FMC					V	
277		Lack of adherence to SOP in terms of fuelling procedure		٧				
278		Undetected incorrect takeoff configuration					٧	
279		Unintuitive and / or error prone system manual - communication equipment.				V		
280		Altitude deviation				V		
281		Level bust (pilot lapse or late re-clearance by ATC)				V		
282		Flaws in conflict and separation minima infringement detection / elimination procedures				V		
283		Lack of adherence of airlines to time contraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data.				٧		
284		Incorrect use of communication equipment				V		<u> </u>
285		Separation of structural element / component of the aircraft during take-off or landing		V				
286		Lack of adherence to engine limitations		V				
287		Failure to remember / assess crosswind component limit for prevailing runway condition					V	V
288		Failure to comply with an altitude or speed restriction / constraint				V		



	Safety Performance	Precursors		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
289		Deviation from flight trajectory commanded by controller				V		
290		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Anti-icing system components		٧				
291		Lack of adherence to SOP for take-off procedure in terms of altimeter callibration.				V		<u>L</u>
292		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MTCD System				V		
293		Lack of adherence of airlines to declared Flight Plan.				V		
294		Failure to identify the pre-tactical conflict before it reach the tactical controller				V		
295		Lack of adherence to SOP for Airborne operation in terms of minimum seprataion				V		
296		Military activity in controlled airport or located within controlled area				٧		
297		General aviation activity in controlled airport or located within controlled area				V		
298		Intensified traffic related to general aviation activity e. g. over GA airport / airfield				٧		
299		Excessive pitch attitude		٧				
300		Excessive bank angle		٧				
301		Flaws in manufacturer quality control process - Anti-icing system components		٧				
302		Flaws in aircraft system maintenance process definition - Anti-icing systems components		٧				
303		DME / ILS DME confusion in assessing the final descent point / FAF		٧				٧
304		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components		٧			V	
305		Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling		٧			V	
306		Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared		>				٧
307		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System.		٧				٧
308		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of fire detection / warning or / and extinguishing system.		٧				
309		Flaws in manufacturer quality control process - Power supply system components		٧			V	
310		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system		V				V
311		Lack of adherence to AFM in terms of emergency procedures - stall recovery		V			V	
312		Flaws in manufacturer quality control process - PWS system components		V				V
313		Imbalanced and inaproppriate relation between cpt and his subordinates			V			
314		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.	<u> </u>	>			T	٧



	Safety Performance	Drocurrors		Ор	eration	al issu	2	
No.	Indicators	Precursors	1	2	3	4	5	6
315		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - LLWAS system		V				V
316		Flaws in aircraft system maintenance process definition - Fire extinguishing system components		V			V	
317		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components					V	
318		Callsign confusion	V					
319		Unintuitive and / or error prone system manual - ground radar.	V				V	<u> </u>
320		Lack of adherence to SOP in terms of aircraft icing (condition) monitoring		V			V	l
321		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FCS system or components		V			٧	
322		Flaws in manufacturer quality control process - FCS system components		V			V	
323		Flaws in aircraft system maintenance process definition - FCS systems or components		V			V	l
324		Lack of adherence to SOP in terms of ATCO and approach or ground controller communication	V					l
325		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground Radar	٧					
326		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ground radar at the airport.	V					
327		Lack of adherence to SOP in terms of awareness on supporting systems (warning) - ground radar.	V					
328		Late rejected takeoff decision / initiation					V	
329		Descent above desired descent profile		V				V
330		Lack of adherence to AFM limitations for landing		V				٧
331		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine		V			٧	
332		Flaws in manufacturer quality control process - Autothrottle system in the engine.		V			V	
333		Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.		V			V	
334		Lack of adherence to AFM in terms of emergency procedures - engine restart procedure		V				
335		Lack of adherence to SOP in terms of awareness on supporting systems warning		V				
336		Unintuitive and / or error prone system manual - ECAM		٧				
337		Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations					V	
338		Tailwind component above limit						٧
339		Flaws in manufacturer quality control process - Engine sensors		V				



	Safety Performance	Drocursors		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
340		Flaws in aircraft system maintenance process definition - Engine sensors		V				1
341		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine sensors		V				
342		Lack of adherence to emergency procedures - WEM		V				V
343		Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.		V			٧	
344		Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT)		V			V	1
345		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - antiice fluid HOT		V			٧	
346		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment	V					
347		Lack of adherence to SOP in terms of safety best practices		V				<u> </u>
348		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ADI system components		V		V		
349		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of STCA System.				V		
350		Lack of adherence to regulations concerning independent ATCO monitoring				٧		
351		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - STCA System				٧		
352		Lack of adherence to AFM in terms of emergency procedures - fire detection and extinguishing procedure		V				
353		Lack of adherence to SOP for GND movements. Poor execution of parking / docking /pushback procedure	V					
354		Go-around attempt after thrust reversers deployment		V				٧
355		Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing		V			٧	
356		Flaws in aircraft system maintenance process definition - ADI system components		V				
357		Flaws in manufacturer quality control process - ADI system components		V				
358		Slow rotation (i.e., low pitch rate)					٧	
359		Lack of adherence to emergency procedures - RWY collision avoidance	V					
360		Incorrect use of automation - TOCW System					V	
361		Flaws in aircraft system maintenance process definition - TOCW System					V	
362		Unintuitive and / or error prone system manual - TOCW					٧	
363		Inadequate effectivenes of fire extinguishing system		V				
364		Lack of adherence to the SOP in terms of critical maneuvre execution		V				
365		Applied de-icing / anti-icing method is not sufficient for predicted conditions		V			٧	



	Safety Performance	Precursors		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
366		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System					V	
367		Incorrect use of automation - Anti-icing system		٧				
368		Unintuitive and / or error prone system manual - Anti-icing system		V				
369		Lack of adherence to SOP in terms of pre-flight inspections -presence of anti-contamination covers on pitot static tube		>				
370		Lack of adherence to SOP in terms of briefing and checklist before initiating of start of taxiing and take-off		V				
371		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Pitot static system components		V				
372		Flaws in manufacturer quality control process - Pitot static system components		٧				
373		Flaws in aircraft system maintenance process definition - Pitot static systems components		٧				
374		Lack of adherence to SOP for take-off procedure in terms of speed bug checklist preparation and verification.					٧	
375		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ADI		V				
376		Flaws in manufacturer quality control process - ADI		>				
377		Flaws in aircraft system maintenance process definition - ADI		V				
378		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ASI		٧				
379		Flaws in manufacturer quality control process - ASI		V				
380		Flaws in aircraft system maintenance process definition - ASI		V				
381		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PFD		V				
382		Flaws in manufacturer quality control process - PFD		V				
383		Flaws in aircraft system maintenance process definition - PFD		V				
384		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine fuel distribution system		V				
385		Flaws in manufacturer quality control process - Engine fuel distribution system		V				
386		Flaws in aircraft system maintenance process definition - Engine fuel distribution system		٧				
387		Unintuitive and / or error prone system manual - fire extinguishing system		٧				
388		Flaws in aircraft system maintenance process definition - stickshaker		٧	V		٧	
389		Late activation of pedal braking or takeover from autobrake, when so required		٧				٧
390		Delayed selection of reverse thrust		٧				٧



	Safety Performance	Ducasiyaaya		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
391		Inappropriate selection of autobrake mode for given runway length and condition		٧				٧
392		Poor application of T/O & RTO procedure, braking initiation sequence					٧	
393		Lack of adherence to SOP in terms of requested information support for other aircraft in terms of adverse weather conditions		V				
394		Lack of adherence to SOP in terms of application of findings from weather report		V				<u> </u>
395		Lack of adherence to SOP in terms of AFM limitations in terms of weigh and balance		V				1
396		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - stickshaker system components		V			V	
397		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment					V	<u> </u>
398		Flight below maneuvering speeds		V				
399		Lack of adherence to SOP in terms of awareness on supporting systems warning - stickshaker		٧			٧	
400		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.					٧	
401		Incorrect weather report obtained by the flight crew		V				
402		Lack of adherence to SOP in terms of providing flight crew with current weather report		٧				
403		Lack of adherence of passengers to the recommendation: Fasten seat belt while seated		٧				
404		Lack of adherence to SOP in terms of "fasten your seat belt" information activation in passenger cabin during flight in turbulence conditions		٧				
405		Lack of adherence to SOP in terms of load sheet preparation and verification		V				
406		Lack of adherence to the current technology standards in terms of flight safety and efficiency - fuel tank allocation.		V				
407		Lack of adherence to emergency procedures - recovery from severe FCS failure		V				
408		Flaws in airport capacity management process					٧	
409		Unintuitive and / or error prone system manual - On-board weather radar.		V				
410		Incorrect use of automation - On-board weather radar		V				
411		Lack of adherence to SOP for take-off procedure in terms of time limitation for take-off preparation.					٧	
412		Inadequate airline / regulatory provider policy in terms of aware of the risks related to air travel		V				
413		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - On-board weather radar		V				
414		Flaws in manufacturer quality control process - On-board weather radar		٧				
415		Flaws in aircraft system maintenance process definition - On-board weather radar		٧				
416		Poor application of T/O & RTO procedure, computation of T/O parameters					V	



	Safety Performance	Duranteen		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
417		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Rudder components.		V				
418		Flaws in aircraft system maintenance process definition - Rudder components.		V				
419		Flaws in manufacturer quality control process - Rudder components.		V				
420		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Horizontal stabilizer components.		V				
421		Flaws in aircraft system maintenance process definition - Horizontal stabilizer components.		V				
422		Flaws in manufacturer quality control process - Horizontal stabilizer components.		V				
423		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Thrust reverse system in the engine.		V				
424		Flaws in manufacturer quality control process - Thrust reverse system in the engine.		V				
425		Flaws in aircraft system maintenance process definition - Thrust reverse system in the engine.		V				
426		Inadequate crosswind landing / decrab technique						٧
427		Touchdown off centerline						٧
428		Inappropriate use of differential reverse thrust						٧
429		Lack of adherence to SOP in terms of pre-flight inspections - cargo securing quality		V				
430		Inadequate use of differential braking						٧
431		Use of nose wheel steering tiller during rollout						٧
432		Lack of adherence to SOP in terms of awareness on supporting systems (warning) - RIMCAS.	V					
433		Error in calculation of necessary amount of fuel		V				٧
434		Lack of adherence to SOP in terms of pre-flight inspections - ice presence on aircraft		V				
435		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components		V				
436		Flaws in aircraft system maintenance process definition - Aircraft door system and / or components		V				
437		Long / floating flare						٧
438		Flaws in manufacturer quality control process - CPCS system and / or components		٧				
439		Flaws in aircraft system maintenance process definition - CPCS system and / or components		٧				
440		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - CPCS system and / or components		٧				
441		Lack of adherence to ICAO Annex 14 and related documents in terms of airside lights distribution	V					
442		Lack of adherence to ICAO Annex 14 and related documents in terms of nonrestricted view on airsite from TWR	V					



	Safety Performance	Ducasinosus		Op	eration	al issuc	2	
No.	Indicators	Precursors	1	2	3	4	5	6
443		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of Runway Conflict Warning System.	V					
444		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - RCWS	V					
445		Lack of adherence to TO procedure in terms of antiice protection		V				<u> </u>
446		Flaws in manufacturer quality control process - anti-ice fluid specifications (HOT)		V				
447		Lack of adherence to emergency procedures - flight deck smoke procedure		V				<u> </u>
448		Lack of adherence to the SOP in terms of critical maneuvre execution - flare		V				
449		Extreme operation condition / poor maintenance quality / advanced life lenght		V				
450		Incorrect use of automation - CPCS		V				<u> </u>
451		Failure to arm ground-spoilers		V				V
452		Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain)			V			<u> </u>
453		Premature descent to DA(H) before G/S intercept or premature descent to MDA(H) before final-descent-point / FAF			V			
454		Premature descent below MDA(H) before reaching the visual-descent-point (VDP)			V			
455		Flight below desired flight path during initial and/or final approach			V			
456		Continued approach, when below DA(H) or MDA(H), after loss of visual references			V			l
457		Late or inadequate response to MSAW warning			V			
458		Failure to go-around, when so required			V			
459		Failure to follow published missed-approach procedure			V			
460		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of MSAW system.			V			
461		Lack of adherence to AFM in terms of emergency procedures - windshear recovery		V				
462		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MSAW System			V			
463		Lack of adherence to the current technology standards in terms of flight safety and efficiency - engines location.		V				<u> </u>
464		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. MSAW warning.			V			
465		Inadequate stall recovery procedure for the aircraft	V				V	
466		Late thrust reduction or power-on touchdown		V				V
467		Use of non-standard phraseology by pilot flying (PF) and/or pilot not flying (PNF)		٧				
468		Lack of adherence to SOP in terms of necessary amount of fuel		٧				V
469		Flaws in manufacturer quality control process - Stickshaker system components		V			٧	



	Safety Performance	Precursors		Operational issue 1 2 3 4 5					
No.	Indicators	Pietuisois	1	2	3	4	5	6	
470		Lack of adherence to AFM in terms of emergency procedures - engine failure		V					
471		Inadequate management / separation of takeoffs and landings	V						
472		Flaws in manufacturer quality control process - TOCW system components					V		
473		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment		V					
474		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ACAS system components				V			
475		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS			٧				
476		Inappropriate visual avoidance maneuver				V			
477		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ACAS installed on aircraft.				V			
478		Late or inadequate response to ACAS warning				V			
479		Taxiing without clearance		V			<u> </u>		
480		Flaws in aircraft system maintenance process definition - GPWS system components			V				
481		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - GPWS system components			٧				
482		Flaws in manufacturer quality control process - GPWS system components			V				
131	The number of organisations that have fully implemented a Safety Management System before the final transitional dates allowed	Pilot tiredness - Inadequate workload distribution	V	V	V	V	٧	V	
132		Flaws in pilot requirements definition process and/or training methodology	V	V	>	V	V	V	
133		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	V	٧	V	٧	V	V	
134		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	V	V	V	V	V	V	
135		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	V	٧	٧	٧	V	٧	
136		Traffic controller tiredness - Inadequate workload distribution	V	V	V	V	V	V	
137		Flaws in traffic controller requirements definition process and/or training methodology	V	V	V	V	V	V	
138		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		٧			V	٧	
139		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.		V			V	V	



	Safety Performance	Precursors		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
140		Lack of adherence to SOP in terms of approach and landing		V	V		<u> </u>	V
141		Lack of English proficiency	V	V	V	V	V	
142		Lack of or poor communication quality	V		V	V	٧	
143		Unintuitive and / or error prone system manual - CPCS		V			٧	V
144		Use of non-standard phraseology by pilot and/or controller	V	V	V	V	V	
145		Lack of adherence to the SOP in terms of critical indicators cross-checking		V	V			
146		Flaws in CRM training procedures		V	V		V	V
147		Lack of adherence to the main CRM rules		V	V		٧	V
148		Incorrect use of automation - FMS		V	V			V
149		Unintuitive and / or error prone system manual - FMS		V	V			V
150		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	V		V	V	٧	
151		Aggressive maneuvering / overcontrolling		V			1	V
152		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring		٧			٧	V
153		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		٧			٧	V
154		Inadequate aircraft de-icing / anti-icing		V			٧	
155		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components		٧			V	
156		Flaws in manufacturer quality control process - Engine systems and / or components		V			V	
157		Incorrect or confusing / misleading ATC instructions	V	V	V	V	٧	
158		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).		٧	V			V
159		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)		٧	V	٧	V	
160		Flaws in aircraft system maintenance process definition - Fuel system compoonents		V			1	
161		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fuel system components		٧				
162		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)		V	V	V	٧	
163		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)		V	V	V	٧	
164		Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing		V				V
165		Lack of adherence to SOP in terms of de-icing / anti-icing procedures.		V	<u> </u>		٧	



	Safety Performance	Precursors		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
166		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.		V	V			V
167		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components			V	V	٧	
168		Flaws in manufacturer quality control process - Onboard navigational systems and components.			V	V	V	
169		Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather.		V				V
170		Current airport diagram not reflecting critical changes	V		V			
171		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Integrity of primary aircraft structure.		V				
172		Flaws in manufacturer quality control process - Integrity of primary aircraft structure.		V				
173		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path		V				V
174		Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.		V				
175		Lack of adherence to emergency procedures - control recovery		V				V
176		Altimeter setting error			V	V		
177		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.		V			V	
178		Flaws in aircraft system maintenance process definition - Components of Wing control surface system.		V			V	
179		Flaws in manufacturer quality control process - Components of Wing control surface system.		V			V	
180		Lack of adherence to SARPs in terms of avoiding adverse weather conditions during flight		V				
181		Lack of adherence to SOP in terms of AFM limitations		V				
182		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					V	
183		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components		V			٧	
184		Flaws in aircraft system maintenance process definition - APU systems and / or components		V			V	
185		Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure		V				٧
186		Flaws in manufacturer quality control process - Fuel system components.		V				
187		Flaws in aircraft system maintenance process definition - Landing gear components.		V				
188		Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.	V				٧	
189		Flaws in manufacturer quality control process - Landing gear components.		V				
190		Flaws in aircraft system maintenance process definition - Engine systems and / or components		V			V	



	Safety Performance	Precursors		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
191		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine anti-ice systems and / or components		V				
192		Flaws in manufacturer quality control process - Engine anti-ice system and / or components		V				
193		Flaws in aircraft system maintenance process definition - Engine anti-ice system and / or components		V				
194		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.			V	V	V	
195		Lack of adherence to SOP for GND movements.	V	V				
196		Hearback ommitted	V			V		
197		Incorrect use of automation -Engine anti-ice system		٧				
198		Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination		V	V			
199		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Reduction gear in the engine		V				
200		Flaws in manufacturer quality control process - Reduction gear in the engine.		V				
201		Flaws in aircraft system maintenance process definition - Reduction gear in the engine.		V				
202		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence	V				٧	
203		Inadequate de-icing method applied		V				
204		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Compressor in the engine		V				
205		Flaws in manufacturer quality control process - Compressor in the engine.		V				
206		Flaws in aircraft system maintenance process definition - Compressor in the engine.		V				
207		Flaws in manufacturer quality control process - Engine accessory drive components.		V				
208		Flaws in aircraft system maintenance process definition - Engine accessory drive components.		٧				
209		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine accessory drive components.		٧				
210		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ECAM (or similar) system components.		V				
211		Lack of adherence to Rules of the Air - adherence to Controller clearance				٧	V	
212		Lack of adherence to emergency procedures - Fuel starvation		V				
213		Flaws in aircraft system maintenance process definition - Oil distribution system		V				
214		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Oil distribution system		V				



	Safety Performance	Ducasinosia		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
215		Flaws in manufacturer quality control process - Oil distribution system		V				
216		Flaws in manufacturer quality control process - APU systems and / or components		٧			٧	
217		Flaws in manufacturer quality control process - Fire extinguishing system components		V		V	٧	
218		Flaws in aircraft system maintenance process definition - ECAM (or similar) system components.		٧				
219		Unintuitive and / or error prone system manual - Engine anti-icing system		٧				
220		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ECAM.		٧				
221		Flaws in manufacturer quality control process - ECAM (or similar) system components.		٧				
222		Flaws in Airspace and Air Traffic planning procedures design process				V	٧	
223		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity	V				V	
224		Flaws in aircraft system maintenance process definition - Electrical wiring System		V			V	
225		Flaws in aircraft system maintenance process definition - Engine combustor		V				
226		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine combustor		V				
227		Flaws in manufacturer quality control process - Engine combustor		V				
228		Flaws in aircraft system maintenance process definition - Engine turbine components		٧				
229		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine turbine components		٧				
230		Flaws in manufacturer quality control process - Engine turbine components		V				
231		Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.					٧	
232		Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.					٧	
233		Incorrect stab-trim setting					٧	
234		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS)			V			
235		Failure to check navigation accuracy before approach			V			
236		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. Navigational aid failure.			V			
237		Not recognized ground Navaids System failure not reflected in NOTAM messages			V			
238		High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,)		٧				V
239		Late deceleration and configuration set-up for approach and landing		V				٧



	Safety Performance	Duanimanua		Op	eration	al issu	е	
No.	Indicators	Precursors	1	2	3	4	5	6
240		Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS)			V			
241		Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS)			V			
242		Inadvertent deviation from cleared taxi route	V					
243		Lack of adherence to SOP for AIR operations in terms of controller error in approach clearence instruction			V			
244		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components		V			V	
245		Flaws in aircraft system maintenance process definition - Hydraulic System		V			V	
246		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.				٧	٧	
247		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.				٧	V	
248		Flaws in manufacturer quality control process - Communication equipment systems and components.				V	V	
249		Tactical or / and Planning Controller tiredness - Inadequate workload distribution				٧		
250		Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology				٧		
251		Navigation deviation				V	٧	
252		Poor application of T/O & RTO procedure, aircraft handling					٧	
253		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum		٧			V	٧
254		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components		٧			V	
255		Takeoff without clearance	V				V	
256		Landing without clearance	V				V	
257		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake)	٧				V	
258		Poor application of T/O & RTO procedure, failure recognition and preparedness					٧	
259		Flaws in aircraft system maintenance process definition - Fire detection system components		V			٧	
260		Flaws in manufacturer quality control process - Fire detection system components		V			٧	
261		Flaws in aircraft system maintenance process definition - Fire warning system		V			٧	
262		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system		V			V	
263		Flaws in manufacturer quality control process - Fire warning system		٧			٧	
264		Lack of adherence to AFM limitations for Take-off		٧			V	



	Safety Performance	December		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
265		Inadequate coordination between ATM centers and/or ATC sectors				V		
266		Unstabilized final approach (high, fast, steep,)		٧				V
267		Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	V				٧	
268		Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	V				٧	
269		Difference indications of independent aircraft speed / altitude or attitude indicators		V				
270		Inadequate maintenance of fire vulnerable aircraft parts or components		V				
271		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements in terms of fire resistance		V				
272		Lack of adherence to regulations concerning transport of DGR goods		٧				
273		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Electrical / wiring system components		V				
274		Flaws in manufacturer quality control process - Electrical / wiring systems components		٧				
275		Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications	V				V	
276		Unintuitive and / or error prone system manual - FMC					V	
277		Lack of adherence to SOP in terms of fuelling procedure		V			<u> </u>	
278		Undetected incorrect takeoff configuration					V	
279		Unintuitive and / or error prone system manual - communication equipment.				V		
280		Altitude deviation				V		
281		Level bust (pilot lapse or late re-clearance by ATC)				V		
282		Flaws in conflict and separation minima infringement detection / elimination procedures				V		
283		Lack of adherence of airlines to time contraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data.				V		
284		Incorrect use of communication equipment				V	<u> </u>	
285		Separation of structural element / component of the aircraft during take-off or landing		V				
286		Lack of adherence to engine limitations		V				
287		Failure to remember / assess crosswind component limit for prevailing runway condition					V	V
288		Failure to comply with an altitude or speed restriction / constraint				٧		
289		Deviation from flight trajectory commanded by controller				٧		
290		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Anti-icing system components		V				



	Safety Performance	Precursors		Ор	eration	al issu	e	
No.	Indicators	FIECUISOIS	1	2	3	4	5	6
291		Lack of adherence to SOP for take-off procedure in terms of altimeter callibration.				V		<u>L</u>
292		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MTCD System				V		
293		Lack of adherence of airlines to declared Flight Plan.				V		
294		Failure to identify the pre-tactical conflict before it reach the tactical controller				V		
295		Lack of adherence to SOP for Airborne operation in terms of minimum seprataion				V		
296		Military activity in controlled airport or located within controlled area				V		
297		General aviation activity in controlled airport or located within controlled area				V		
298		Intensified traffic related to general aviation activity e. g. over GA airport / airfield				V		
299		Excessive pitch attitude		V				
300		Excessive bank angle		٧				
301		Flaws in manufacturer quality control process - Anti-icing system components		٧				
302		Flaws in aircraft system maintenance process definition - Anti-icing systems components		V				
303		DME / ILS DME confusion in assessing the final descent point / FAF		V				٧
304		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components		٧			٧	
305		Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling		V			V	
306		Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared		V				٧
307		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System.		V				٧
308		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of fire detection / warning or / and extinguishing system.		V				
309		Flaws in manufacturer quality control process - Power supply system components		٧			V	
310		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system		V				V
311		Lack of adherence to AFM in terms of emergency procedures - stall recovery		V			V	
312		Flaws in manufacturer quality control process - PWS system components		V				٧
313		Imbalanced and inaproppriate relation between cpt and his subordinates			V			
314		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.		٧				٧
315		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - LLWAS system		V				V
316		Flaws in aircraft system maintenance process definition - Fire extinguishing system components		V			٧	



	Safety Performance	Ducasinosus		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
317		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components					V	
318		Callsign confusion	V					
319		Unintuitive and / or error prone system manual - ground radar.	V				٧	
320		Lack of adherence to SOP in terms of aircraft icing (condition) monitoring		V			V	1
321		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FCS system or components		V			V	
322		Flaws in manufacturer quality control process - FCS system components		V			V	<u> </u>
323		Flaws in aircraft system maintenance process definition - FCS systems or components		V			V	<u> </u>
324		Lack of adherence to SOP in terms of ATCO and approach or ground controller communication	٧					
325		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground Radar	V					
326		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ground radar at the airport.	V					
327		Lack of adherence to SOP in terms of awareness on supporting systems (warning) - ground radar.	V					
328		Late rejected takeoff decision / initiation					٧	
329		Descent above desired descent profile		V				V
330		Lack of adherence to AFM limitations for landing		V				٧
331		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine		٧			V	
332		Flaws in manufacturer quality control process - Autothrottle system in the engine.		V			٧	
333		Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.		V			٧	
334		Lack of adherence to AFM in terms of emergency procedures - engine restart procedure		V				
335		Lack of adherence to SOP in terms of awareness on supporting systems warning		V				
336		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment	V					
337		Unintuitive and / or error prone system manual - ECAM		V				
338		Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations					٧	
339		Tailwind component above limit						٧
340		Flaws in manufacturer quality control process - Engine sensors		٧				
341		Flaws in aircraft system maintenance process definition - Engine sensors		V				



	Safety Performance	Duranturant		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
342		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine sensors		V				
343		Lack of adherence to emergency procedures - WEM		V			<u> </u>	V
344		Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.		V			V	
345		Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT)		V			V	
346		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - antiice fluid HOT		٧			٧	
347		Lack of adherence to SOP in terms of safety best practices		V			<u> </u>	
348		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ADI system components		٧		V		
349		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of STCA System.				V	<u> </u>	
350		Lack of adherence to regulations concerning independent ATCO monitoring				V	<u> </u>	
351		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - STCA System				٧		
352		Lack of adherence to AFM in terms of emergency procedures - fire detection and extinguishing procedure		V				
353		Lack of adherence to SOP for GND movements. Poor execution of parking / docking /pushback procedure	V					
354		Go-around attempt after thrust reversers deployment		٧				V
355		Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing		٧			٧	
356		Flaws in aircraft system maintenance process definition - ADI system components		٧				
357		Flaws in manufacturer quality control process - ADI system components		٧				
358		Slow rotation (i.e., low pitch rate)					٧	
359		Lack of adherence to emergency procedures - RWY collision avoidance	V					
360		Incorrect use of automation - TOCW System					٧	
361		Flaws in aircraft system maintenance process definition - TOCW System					٧	
362		Unintuitive and / or error prone system manual - TOCW					٧	
363		Inadequate effectivenes of fire extinguishing system		V				
364		Lack of adherence to the SOP in terms of critical maneuvre execution		V				
365		Applied de-icing / anti-icing method is not sufficient for predicted conditions		٧			٧	
366		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System					٧	
367		Incorrect use of automation - Anti-icing system		V			1	



	Safety Performance	Dura susura sa		Ор	eration	al issu	<u></u>	
No.	Indicators	Precursors	1	2	3	4	5	6
368		Unintuitive and / or error prone system manual - Anti-icing system		٧				
369		Lack of adherence to SOP in terms of pre-flight inspections -presence of anti-contamination covers on pitot static tube		V				
370		Lack of adherence to SOP in terms of briefing and checklist before initiating of start of taxiing and take-off		V				
371		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Pitot static system components		٧				
372		Flaws in manufacturer quality control process - Pitot static system components		V				
373		Flaws in aircraft system maintenance process definition - Pitot static systems components		V				
374		Lack of adherence to SOP for take-off procedure in terms of speed bug checklist preparation and verification.					V	
375		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ADI		٧				
376		Flaws in manufacturer quality control process - ADI		V				
377		Flaws in aircraft system maintenance process definition - ADI		V				
378		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ASI		V				
379		Flaws in manufacturer quality control process - ASI		V				
380		Flaws in aircraft system maintenance process definition - ASI		V				
381		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PFD		V				
382		Flaws in manufacturer quality control process - PFD		V				
383		Flaws in aircraft system maintenance process definition - PFD		V				
384		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine fuel distribution system		٧				
385		Flaws in manufacturer quality control process - Engine fuel distribution system		V				
386		Flaws in aircraft system maintenance process definition - Engine fuel distribution system		V				
387		Unintuitive and / or error prone system manual - fire extinguishing system		V				
388		Flaws in aircraft system maintenance process definition - stickshaker		٧	V		V	
389		Late activation of pedal braking or takeover from autobrake, when so required		٧				V
390		Delayed selection of reverse thrust		V				V
391		Inappropriate selection of autobrake mode for given runway length and condition		٧			_	٧
392		Poor application of T/O & RTO procedure, braking initiation sequence					V	
393		Lack of adherence to SOP in terms of requested information support for other aircraft in terms of adverse weather		٧				



	Safety Performance	Precursors		Op	eration	al issu	a	
No.	Indicators	Precursors	1	2	3	4	5	6
		conditions						
394		Lack of adherence to SOP in terms of application of findings from weather report		٧				
395		Lack of adherence to SOP in terms of AFM limitations in terms of weigh and balance		V				
396		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - stickshaker system components		V			V	
397		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment					V	
398		Flight below maneuvering speeds		V				
399		Lack of adherence to SOP in terms of awareness on supporting systems warning - stickshaker		V			V	
400		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.					V	
401		Incorrect weather report obtained by the flight crew		٧				
402		Lack of adherence to SOP in terms of providing flight crew with current weather report		V				
403		Lack of adherence of passengers to the recommendation: Fasten seat belt while seated		٧				
404		Lack of adherence to SOP in terms of "fasten your seat belt" information activation in passenger cabin during flight in turbulence conditions		V				
405		Lack of adherence to SOP in terms of load sheet preparation and verification		٧				
406		Lack of adherence to the current technology standards in terms of flight safety and efficiency - fuel tank allocation.		V				
407		Lack of adherence to emergency procedures - recovery from severe FCS failure		V				
408		Flaws in airport capacity management process					V	
409		Unintuitive and / or error prone system manual - On-board weather radar.		V				
410		Incorrect use of automation - On-board weather radar		٧				
411		Lack of adherence to SOP for take-off procedure in terms of time limitation for take-off preparation.					٧	
412		Inadequate airline / regulatory provider policy in terms of aware of the risks related to air travel		٧				
413		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - On-board weather radar		V				
414		Flaws in manufacturer quality control process - On-board weather radar		V				
415		Flaws in aircraft system maintenance process definition - On-board weather radar		٧				
416		Poor application of T/O & RTO procedure, computation of T/O parameters					V	
417		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Rudder components.		V				
418		Flaws in aircraft system maintenance process definition - Rudder components.		٧				



	Safety Performance	Drocursors		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
419		Flaws in manufacturer quality control process - Rudder components.		V				
420		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Horizontal stabilizer components.		V				
421		Flaws in aircraft system maintenance process definition - Horizontal stabilizer components.		V				
422		Flaws in manufacturer quality control process - Horizontal stabilizer components.		V				
423		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Thrust reverse system in the engine.		V				
424		Flaws in manufacturer quality control process - Thrust reverse system in the engine.		V				
425		Flaws in aircraft system maintenance process definition - Thrust reverse system in the engine.		V				
426		Inadequate crosswind landing / decrab technique						V
427		Touchdown off centerline						V
428		Inappropriate use of differential reverse thrust						V
429		Lack of adherence to SOP in terms of pre-flight inspections - cargo securing quality		V				
430		Inadequate use of differential braking						V
431		Use of nose wheel steering tiller during rollout						V
432		Lack of adherence to SOP in terms of awareness on supporting systems (warning) - RIMCAS.	V					
433		Error in calculation of necessary amount of fuel		V				V
434		Lack of adherence to SOP in terms of pre-flight inspections - ice presence on aircraft		٧				
435		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components		V				
436		Flaws in aircraft system maintenance process definition - Aircraft door system and / or components		V				
437		Long / floating flare						V
438		Flaws in manufacturer quality control process - CPCS system and / or components		٧				
439		Flaws in aircraft system maintenance process definition - CPCS system and / or components		٧				
440		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - CPCS system and / or components		٧				
441		Lack of adherence to ICAO Annex 14 and related documents in terms of airside lights distribution	V					
442		Lack of adherence to ICAO Annex 14 and related documents in terms of nonrestricted view on airsite from TWR	V					
443		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of Runway Conflict Warning System.	V					
444		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance	V					



	Safety Performance	D		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
		with requirements - RCWS						
445		Lack of adherence to TO procedure in terms of antiice protection		V				
446		Flaws in manufacturer quality control process - anti-ice fluid specifications (HOT)		V				
447		Lack of adherence to emergency procedures - flight deck smoke procedure		V				
448		Lack of adherence to the SOP in terms of critical maneuvre execution - flare		V				
449		Extreme operation condition / poor maintenance quality / advanced life lenght		V				
450		Incorrect use of automation - CPCS		V				
451		Failure to arm ground-spoilers		V				٧
452		Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain)			V			
453		Premature descent to DA(H) before G/S intercept or premature descent to MDA(H) before final-descent-point / FAF			٧			
454		Premature descent below MDA(H) before reaching the visual-descent-point (VDP)			V			
455		Flight below desired flight path during initial and/or final approach			V			
456		Continued approach, when below DA(H) or MDA(H), after loss of visual references			V			
457		Late or inadequate response to MSAW warning			V			
458		Failure to go-around, when so required			V			
459		Failure to follow published missed-approach procedure			V			
460		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of MSAW system.			V			
461		Lack of adherence to AFM in terms of emergency procedures - windshear recovery		V				
462		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MSAW System			٧			
463		Lack of adherence to the current technology standards in terms of flight safety and efficiency - engines location.		V				
464		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. MSAW warning.			V			
465		Inadequate stall recovery procedure for the aircraft	V				٧	
466		Late thrust reduction or power-on touchdown		V				٧
467		Use of non-standard phraseology by pilot flying (PF) and/or pilot not flying (PNF)		٧				
468		Lack of adherence to SOP in terms of necessary amount of fuel		V				٧
469		Flaws in manufacturer quality control process - Stickshaker system components		V			٧	
470		Lack of adherence to AFM in terms of emergency procedures - engine failure		V				
471		Inadequate management / separation of takeoffs and landings	٧					



	Safety Performance	Ducassaca		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
472		Flaws in manufacturer quality control process - TOCW system components					٧	
473		Lack of adherence to SOP for approach and landing		V				
474		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment		V				
475		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ACAS system components				V		
476		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS			V			
477		Inappropriate visual avoidance maneuver				V		
478		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ACAS installed on aircraft.				V		
479		Late or inadequate response to ACAS warning				V		
480		Taxiing without clearance		V				
481		Flaws in aircraft system maintenance process definition - GPWS system components			V			
482		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - GPWS system components			V			
483		Flaws in manufacturer quality control process - GPWS system components			V		i n	
131	The average level of regulatory compliance of states (for example using ICAO USOAP CMA 8 or EASA audits) should be measured every three years and should increase every three years	Pilot tiredness - Inadequate workload distribution	>	V	٧	V	V	V
132		Flaws in pilot requirements definition process and/or training methodology	V	٧	V	٧	٧	٧
133		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	V	V	V	V	٧	٧
134		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	V	٧	V	V	٧	٧
135		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	V	٧	V	٧	V	V
136		Traffic controller tiredness - Inadequate workload distribution	V	٧	V	V	٧	٧
137		Flaws in traffic controller requirements definition process and/or training methodology	V	٧	V	V	٧	٧
138		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		V			V	V
139		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.		V			V	V



	Safety Performance	Precursors		V V V V V V V V V V V V V V V V V V V				
No.	Indicators	Precursors	1	2	3	4	5	6
140		Lack of English proficiency	V	V	V	V	V	
141		Lack of or poor communication quality	V		٧	V	V	
142		Use of non-standard phraseology by pilot and/or controller	V	V	>	V	V	
143		Lack of adherence to the SOP in terms of critical indicators cross-checking		V	V		<u> </u>	
144		Incorrect use of automation - FMS		V	V		<u> </u>	V
145		Unintuitive and / or error prone system manual - FMS		V	V		<u> </u>	V
146		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	V		V	V	V	
147		Flaws in CRM training procedures		V	V		V	V
148		Lack of adherence to the main CRM rules		V	V		V	V
149		Unintuitive and / or error prone system manual - CPCS		V			V	V
150		Lack of adherence to SOP in terms of approach and landing		V	V		<u> </u>	V
151		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		V			V	V
152		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring		V			V	V
153		Inadequate aircraft de-icing / anti-icing		V			V	
154		Aggressive maneuvering / overcontrolling		V			<u> </u>	V
155		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components		V			V	
156		Flaws in manufacturer quality control process - Engine systems and / or components		V			V	
157		Incorrect or confusing / misleading ATC instructions	V	V	V	V	V	
158		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)		V	٧	V	V	
159		Flaws in aircraft system maintenance process definition - Fuel system compoonents		V			<u> </u>	
160		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fuel system components		V				
161		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)		V	٧	V	٧	
162		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)		V	٧	V	٧	
163		Lack of adherence to SOP in terms of de-icing / anti-icing procedures.		V			٧	
164		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components			V	V	٧	
165		Flaws in manufacturer quality control process - Onboard navigational systems and components.			V	V	٧	
166		Current airport diagram not reflecting critical changes	V		٧			



	Safety Performance	Ducasinosia		Op	eration	al issu	е	
No.	Indicators	Precursors	1	2	3	4	5	6
167		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.		V	V			٧
168		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Integrity of primary aircraft structure.		V				
169		Flaws in manufacturer quality control process - Integrity of primary aircraft structure.		V				
170		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path		V				٧
171		Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.		V				
172		Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing		٧				٧
173		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).		V	V			٧
174		Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather.		V				V
175		Altimeter setting error			V	V		
176		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.		V			V	
177		Flaws in aircraft system maintenance process definition - Components of Wing control surface system.		V			٧	
178		Flaws in manufacturer quality control process - Components of Wing control surface system.		V			٧	
179		Lack of adherence to SARPs in terms of avoiding adverse weather conditions during flight		٧				
180		Lack of adherence to emergency procedures - control recovery		٧				V
181		Lack of adherence to SOP in terms of AFM limitations		٧				
182		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					V	
183		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components		V			٧	
184		Flaws in aircraft system maintenance process definition - APU systems and / or components		V			٧	
185		Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure		٧				٧
186		Flaws in manufacturer quality control process - Fuel system components.		V				
187		Flaws in aircraft system maintenance process definition - Landing gear components.		V				
188		Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.	V				V	
189		Flaws in manufacturer quality control process - Landing gear components.		V				
190		Flaws in aircraft system maintenance process definition - Engine systems and / or components		V			V	
191		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance		٧				



	Safety Performance	D		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
		with requirements - Engine anti-ice systems and / or components						
192		Flaws in manufacturer quality control process - Engine anti-ice system and / or components		V				
193		Flaws in aircraft system maintenance process definition - Engine anti-ice system and / or components		V				
194		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.			٧	٧	٧	
195		Lack of adherence to SOP for GND movements.	V	V				
196		Hearback ommitted	V			٧		
197		Incorrect use of automation -Engine anti-ice system		V				
198		Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination		V	٧			
199		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Reduction gear in the engine		V				
200		Flaws in manufacturer quality control process - Reduction gear in the engine.		V				
201		Flaws in aircraft system maintenance process definition - Reduction gear in the engine.		V				
202		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence	V				٧	
203		Inadequate de-icing method applied		V				
204		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Compressor in the engine		V				
205		Flaws in manufacturer quality control process - Compressor in the engine.		V				
206		Flaws in aircraft system maintenance process definition - Compressor in the engine.		V				
207		Flaws in manufacturer quality control process - Engine accessory drive components.		V				
208		Flaws in aircraft system maintenance process definition - Engine accessory drive components.		V				
209		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine accessory drive components.		V				
210		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ECAM (or similar) system components.		V				
211		Lack of adherence to Rules of the Air - adherence to Controller clearance				٧	٧	
212		Lack of adherence to emergency procedures - Fuel starvation		V				
213		Flaws in aircraft system maintenance process definition - Oil distribution system		V				
214		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Oil distribution system		٧				
215		Flaws in manufacturer quality control process - Oil distribution system		V				



	Safety Performance	Ducasinosus		Operational issue				
No.	Indicators	Precursors	1	2	3	4	5	6
216		Flaws in manufacturer quality control process - APU systems and / or components		V			٧	
217		Flaws in manufacturer quality control process - Fire extinguishing system components		٧		٧	٧	
218		Flaws in aircraft system maintenance process definition - ECAM (or similar) system components.		V				
219		Unintuitive and / or error prone system manual - Engine anti-icing system		٧				
220		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ECAM.		٧				
221		Flaws in manufacturer quality control process - ECAM (or similar) system components.		٧				
222		Flaws in Airspace and Air Traffic planning procedures design process				٧	٧	
223		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity	V				V	
224		Flaws in aircraft system maintenance process definition - Electrical wiring System		V			٧	
225		Flaws in aircraft system maintenance process definition - Engine combustor		٧				
226		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine combustor		V				
227		Flaws in manufacturer quality control process - Engine combustor		V				<u> </u>
228		Flaws in aircraft system maintenance process definition - Engine turbine components		٧				
229		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine turbine components		V				
230		Flaws in manufacturer quality control process - Engine turbine components		٧				
231		Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.					V	
232		Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.					V	
233		Incorrect stab-trim setting					V	
234		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS)			V			
235		Failure to check navigation accuracy before approach			V			
236		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. Navigational aid failure.			V			
237		Not recognized ground Navaids System failure not reflected in NOTAM messages			V			
238		Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS)			V			
239		Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS)			V			
240		Inadvertent deviation from cleared taxi route	V					
241		Lack of adherence to SOP for AIR operations in terms of controller error in approach clearence instruction			V			



	Safety Performance	D		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
242		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components		V			٧	
243		Flaws in aircraft system maintenance process definition - Hydraulic System		V			V	
244		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.				V	V	
245		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.				V	V	
246		Flaws in manufacturer quality control process - Communication equipment systems and components.				V	V	
247		Tactical or / and Planning Controller tiredness - Inadequate workload distribution				V		
248		Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology				V		
249		Navigation deviation				V	V	
250		Poor application of T/O & RTO procedure, aircraft handling					V	
251		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum		V			٧	V
252		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components		٧			٧	
253		Takeoff without clearance	V				٧	
254		Landing without clearance	V				V	
255		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake)	V				V	
256		Poor application of T/O & RTO procedure, failure recognition and preparedness					V	
257		Flaws in aircraft system maintenance process definition - Fire detection system components		V			V	
258		Flaws in manufacturer quality control process - Fire detection system components		٧			٧	
259		Flaws in aircraft system maintenance process definition - Fire warning system		V			V	
260		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system		٧			٧	
261		Flaws in manufacturer quality control process - Fire warning system		V			V	
262		Lack of adherence to AFM limitations for Take-off		٧			٧	
263		Inadequate coordination between ATM centers and/or ATC sectors				٧		
264		Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	V				٧	
265		Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	V				٧	
266		Difference indications of independent aircraft speed / altitude or attitude indicators		٧				



	Safety Performance	Decompose		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
267		Inadequate maintenance of fire vulnerable aircraft parts or components		V				
268		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements in terms of fire resistance		V				
269		Lack of adherence to regulations concerning transport of DGR goods		V				
270		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Electrical / wiring system components		V				
271		Flaws in manufacturer quality control process - Electrical / wiring systems components		V				
272		Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications	V				٧	
273		Unintuitive and / or error prone system manual - FMC					٧	
274		Lack of adherence to SOP in terms of fuelling procedure		V				
275		Undetected incorrect takeoff configuration					٧	
276		Unintuitive and / or error prone system manual - communication equipment.				V		
277		Altitude deviation				V		
278		Level bust (pilot lapse or late re-clearance by ATC)				V		
279		Flaws in conflict and separation minima infringement detection / elimination procedures				V		
280		Lack of adherence of airlines to time contraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data.				V		
281		Incorrect use of communication equipment				V		
282		Separation of structural element / component of the aircraft during take-off or landing		V				
283		Lack of adherence to engine limitations		V				
284		Failure to comply with an altitude or speed restriction / constraint				V		
285		Deviation from flight trajectory commanded by controller				V		
286		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Anti-icing system components		V				
287		Lack of adherence to SOP for take-off procedure in terms of altimeter callibration.				٧		
288		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MTCD System				٧		
289		Lack of adherence of airlines to declared Flight Plan.				٧		
290		Failure to identify the pre-tactical conflict before it reach the tactical controller				٧		
291		Lack of adherence to SOP for Airborne operation in terms of minimum seprataion				V		



	Safety Performance	Decompose		Op	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
292		Military activity in controlled airport or located within controlled area				٧		
293		General aviation activity in controlled airport or located within controlled area				V		
294		Intensified traffic related to general aviation activity e. g. over GA airport / airfield				V		
295		High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,)		V				V
296		Late deceleration and configuration set-up for approach and landing		V				٧
297		Excessive pitch attitude		V				
298		Excessive bank angle		V				
299		Flaws in manufacturer quality control process - Anti-icing system components		V				
300		Flaws in aircraft system maintenance process definition - Anti-icing systems components		V				
301		DME / ILS DME confusion in assessing the final descent point / FAF		V				٧
302		Unstabilized final approach (high, fast, steep,)		V				٧
303		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components		٧			V	
304		Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling		٧			V	
305		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of fire detection / warning or / and extinguishing system.		V				
306		Flaws in manufacturer quality control process - Power supply system components		V			V	
307		Lack of adherence to AFM in terms of emergency procedures - stall recovery		V			V	
308		Imbalanced and inaproppriate relation between cpt and his subordinates			V			
309		Flaws in aircraft system maintenance process definition - Fire extinguishing system components		V			٧	
310		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components					V	
311		Failure to remember / assess crosswind component limit for prevailing runway condition					V	V
312		Callsign confusion	V					
313		Unintuitive and / or error prone system manual - ground radar.	V				٧	
314		Lack of adherence to SOP in terms of aircraft icing (condition) monitoring		V			٧	
315		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FCS system or components		V			V	
316		Flaws in manufacturer quality control process - FCS system components		V			V	
317		Flaws in aircraft system maintenance process definition - FCS systems or components		V			V	



	Safety Performance	Ducasinosus		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
318		Lack of adherence to SOP in terms of ATCO and approach or ground controller communication	V					
319		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground Radar	V					
320		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ground radar at the airport.	V					
321		Lack of adherence to SOP in terms of awareness on supporting systems (warning) - ground radar.	V					
322		Late rejected takeoff decision / initiation					V	
323		Descent above desired descent profile		V				V
324		Lack of adherence to AFM limitations for landing		V				V
325		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine		V			V	
326		Flaws in manufacturer quality control process - Autothrottle system in the engine.		V			V	
327		Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.		V			V	
328		Lack of adherence to AFM in terms of emergency procedures - engine restart procedure		V				
329		Lack of adherence to SOP in terms of awareness on supporting systems warning		V				
330		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment	V					
331		Unintuitive and / or error prone system manual - ECAM		V				
332		Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations					٧	
333		Flaws in manufacturer quality control process - Engine sensors		V				
334		Flaws in aircraft system maintenance process definition - Engine sensors		V				
335		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine sensors		V				
336		Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.		V			V	<u> </u>
337		Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT)		V			٧	<u> </u>
338		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - antiice fluid HOT		V			٧	
339		Lack of adherence to SOP in terms of safety best practices		V				
340		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ADI system components		V		V		
341		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of STCA System.				٧		
342		Lack of adherence to regulations concerning independent ATCO monitoring				V		



	Safety Performance	Para survey		Ор	eration	al issu		
No.	Indicators	Precursors	1	2	3	4	5	6
343		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - STCA System				٧		
344		Lack of adherence to AFM in terms of emergency procedures - fire detection and extinguishing procedure		V			1	
345		Lack of adherence to SOP for GND movements. Poor execution of parking / docking /pushback procedure	V					
346		Go-around attempt after thrust reversers deployment		V			1	V
347		Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing		V			V	
348		Flaws in aircraft system maintenance process definition - ADI system components		V			1	
349		Flaws in manufacturer quality control process - ADI system components		V				
350		Slow rotation (i.e., low pitch rate)					٧	
351		Lack of adherence to emergency procedures - RWY collision avoidance	V					
352		Incorrect use of automation - TOCW System					٧	
353		Flaws in aircraft system maintenance process definition - TOCW System					V	
354		Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared						٧
355		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System.						٧
356		Unintuitive and / or error prone system manual - TOCW					٧	
357		Inadequate effectivenes of fire extinguishing system		V				
358		Lack of adherence to the SOP in terms of critical maneuvre execution		V				
359		Applied de-icing / anti-icing method is not sufficient for predicted conditions		V			V	
360		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System					V	
361		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system						V
362		Incorrect use of automation - Anti-icing system		V				
363		Flaws in manufacturer quality control process - PWS system components					<u> </u>	V
364		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.					1	٧
365		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - LLWAS system						V
366		Unintuitive and / or error prone system manual - Anti-icing system		V				
367		Lack of adherence to SOP in terms of pre-flight inspections -presence of anti-contamination covers on pitot static tube		٧				
368		Lack of adherence to SOP in terms of briefing and checklist before initiating of start of taxiing and take-off		V				



	Safety Performance	Precursors		Op	eration	al issuc	e	
No.	Indicators	Precursors	1	2	3	4	5	6
369		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Pitot static system components		V				
370		Flaws in manufacturer quality control process - Pitot static system components		V				<u> </u>
371		Flaws in aircraft system maintenance process definition - Pitot static systems components		V				<u> </u>
372		Lack of adherence to SOP for take-off procedure in terms of speed bug checklist preparation and verification.					V	
373		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ADI		V				
374		Flaws in manufacturer quality control process - ADI		V				<u> </u>
375		Flaws in aircraft system maintenance process definition - ADI		V				1
376		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ASI		٧				
377		Flaws in manufacturer quality control process - ASI		٧				<u>L</u>
378		Flaws in aircraft system maintenance process definition - ASI		٧				
379		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PFD		V				
380		Flaws in manufacturer quality control process - PFD		٧				
381		Flaws in aircraft system maintenance process definition - PFD		٧				
382		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine fuel distribution system		V				
383		Flaws in manufacturer quality control process - Engine fuel distribution system		٧				
384		Flaws in aircraft system maintenance process definition - Engine fuel distribution system		٧				
385		Unintuitive and / or error prone system manual - fire extinguishing system		V				
386		Flaws in aircraft system maintenance process definition - stickshaker		V	V		٧	
387		Poor application of T/O & RTO procedure, braking initiation sequence					٧	
388		Lack of adherence to SOP in terms of requested information support for other aircraft in terms of adverse weather conditions		V				
389		Lack of adherence to SOP in terms of application of findings from weather report		V				
390		Lack of adherence to SOP in terms of AFM limitations in terms of weigh and balance		٧				
391		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - stickshaker system components		V			V	
392		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment					V	
393		Flight below maneuvering speeds		V	-			



	Safety Performance	Durantina		Ор	eration	al issu	e	
No.	Indicators	Precursors	1	2	3	4	5	6
394		Lack of adherence to SOP in terms of awareness on supporting systems warning - stickshaker		V			V	
395		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.					٧	
396		Incorrect weather report obtained by the flight crew		V				
397		Lack of adherence to SOP in terms of providing flight crew with current weather report		V				
398		Lack of adherence of passengers to the recommendation: Fasten seat belt while seated		٧				
399		Lack of adherence to SOP in terms of "fasten your seat belt" information activation in passenger cabin during flight in turbulence conditions		V				
400		Lack of adherence to SOP in terms of load sheet preparation and verification		V				
401		Lack of adherence to the current technology standards in terms of flight safety and efficiency - fuel tank allocation.		V				
402		Lack of adherence to emergency procedures - recovery from severe FCS failure		٧				
403		Flaws in airport capacity management process					V	
404		Unintuitive and / or error prone system manual - On-board weather radar.		٧				
405		Incorrect use of automation - On-board weather radar		٧				
406		Lack of adherence to SOP for take-off procedure in terms of time limitation for take-off preparation.					٧	
407		Inadequate airline / regulatory provider policy in terms of aware of the risks related to air travel		V				
408		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - On-board weather radar		V				
409		Flaws in manufacturer quality control process - On-board weather radar		V				
410		Flaws in aircraft system maintenance process definition - On-board weather radar		٧				
411		Lack of adherence to emergency procedures - WEM						٧
412		Poor application of T/O & RTO procedure, computation of T/O parameters					٧	
413		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Rudder components.		V				
414		Flaws in aircraft system maintenance process definition - Rudder components.		٧				
415		Flaws in manufacturer quality control process - Rudder components.		٧				
416		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Horizontal stabilizer components.		V				
417		Flaws in aircraft system maintenance process definition - Horizontal stabilizer components.		٧				
418		Flaws in manufacturer quality control process - Horizontal stabilizer components.		٧				
419		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Thrust reverse system in the engine.		V				



	Safety Performance	Precursors					Operational issue						
No.	Indicators	Precursors	1	2	3	4	5	6					
420		Flaws in manufacturer quality control process - Thrust reverse system in the engine.		V									
421		Flaws in aircraft system maintenance process definition - Thrust reverse system in the engine.		V									
422		Tailwind component above limit						٧					
423		Lack of adherence to SOP in terms of pre-flight inspections - cargo securing quality		V									
424		Lack of adherence to SOP in terms of awareness on supporting systems (warning) - RIMCAS.	V										
425		Error in calculation of necessary amount of fuel		V				٧					
426		Lack of adherence to SOP in terms of pre-flight inspections - ice presence on aircraft		V									
427		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components		V									
428		Flaws in aircraft system maintenance process definition - Aircraft door system and / or components		V									
429		Flaws in manufacturer quality control process - CPCS system and / or components		V									
430		Flaws in aircraft system maintenance process definition - CPCS system and / or components		V									
431		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - CPCS system and / or components		V									
432		Lack of adherence to ICAO Annex 14 and related documents in terms of airside lights distribution	V										
433		Lack of adherence to ICAO Annex 14 and related documents in terms of nonrestricted view on airsite from TWR	V										
434		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of Runway Conflict Warning System.	٧										
435		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - RCWS	V										
436		Lack of adherence to TO procedure in terms of antiice protection		V									
437		Flaws in manufacturer quality control process - anti-ice fluid specifications (HOT)		V									
438		Lack of adherence to emergency procedures - flight deck smoke procedure		V									
439		Lack of adherence to the SOP in terms of critical maneuvre execution - flare		V									
440		Extreme operation condition / poor maintenance quality / advanced life lenght		V									
441		Incorrect use of automation - CPCS		V									
442		Late activation of pedal braking or takeover from autobrake, when so required		٧				٧					
443		Delayed selection of reverse thrust		٧				٧					
444		Inappropriate selection of autobrake mode for given runway length and condition		٧				٧					
445		Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain)			V								



Safety Performance		Duranina		Ор	eration	al issu		
No.	Indicators	Indicators Precursors					5	6
446		Premature descent to DA(H) before G/S intercept or premature descent to MDA(H) before final-descent-point / FAF			V		1	
447		Premature descent below MDA(H) before reaching the visual-descent-point (VDP)			V			
448		Flight below desired flight path during initial and/or final approach			٧			
449		Continued approach, when below DA(H) or MDA(H), after loss of visual references			V			
450		Late or inadequate response to MSAW warning			V			
451		Failure to go-around, when so required			٧			
452		Failure to follow published missed-approach procedure			٧			
453		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of MSAW system.			>			
454		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MSAW System			٧			
455		Lack of adherence to the current technology standards in terms of flight safety and efficiency - engines location.		V				
456		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. MSAW warning.			٧			
457		Inadequate stall recovery procedure for the aircraft	V				٧	
458		Late thrust reduction or power-on touchdown		V			1	٧
459		Failure to arm ground-spoilers		V			1	٧
460		Use of non-standard phraseology by pilot flying (PF) and/or pilot not flying (PNF)		V				
461		Lack of adherence to SOP in terms of necessary amount of fuel		V				٧
462		Flaws in manufacturer quality control process - Stickshaker system components		V			٧	
463		Lack of adherence to AFM in terms of emergency procedures - engine failure		V			1	
464		Inadequate management / separation of takeoffs and landings	V					
465		Flaws in manufacturer quality control process - TOCW system components					٧	
466		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment		V				
467		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ACAS system components				V		
468		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS			V			
469		Inappropriate visual avoidance maneuver				V	1	
470		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ACAS installed on aircraft.				V		
471		Late or inadequate response to ACAS warning				V		
472		Taxiing without clearance		٧				



	Safety Performance	Safety Performance Precursors					Operational issue						
No.	Indicators	riecuisois	1	2	3	4	5	6					
473		Inadequate crosswind landing / decrab technique						٧					
474		Touchdown off centerline						٧					
475		Inappropriate use of differential reverse thrust						V					
476		Inadequate use of differential braking						V					
477		Use of nose wheel steering tiller during rollout						V					
478		Flaws in aircraft system maintenance process definition - GPWS system components			V								
479		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - GPWS system components			V								
480		Flaws in manufacturer quality control process - GPWS system components			V								



Appendix B for ASCOS D2.3

WP2.3 Process for Safety Performanc Monitoring (lead participant = IoA)

ASCOS will progress beyond the state-of-the-art by developing and validating a continuous monitoring process in which safety performance indicators for each stakeholder will be linked with precursors for all the main operational issues for commercial air transport operations as identified in the European Aviation Safety Plan (EASP) framework [2, 10]. This task will investigate how CMA can be used as integral part of the life cycle processes for continued airworthiness of aircraft, and maintenance of certificates for air navigation service providers, operators, and manufacturers. ASCOS will investigate if and how flight data obtained by Flight Data Monitoring (FDM) and Flight operations Quality Assurance (FOQA) can be used to enhance the safety benefits of a multi-stakeholder CMA in aviation. [314299 ASCOS - Workplan table - 2012-05-16 15:09 - Page 8 of 29]

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EASp category	Used in ESD
RE (RE) TO	1-2-3-4- 5 -9-10
RE (RE) Landing	19 -23-25-26-27
MAC (MAC)	31
Controlled Flight Into Terrain (CFIT)	35
Loss of Control In Flight (LOC-I)	5 -6-8-11-12-13-14-15-16-17-18- 19 -21- <mark>33-38</mark>
Ground Collisions (GCOL)	32-36

Source: ASCOS D3.2, p. 23

ESDs not present in CATS for ASCOS V0.1.xls - in red



B. Details of Step 1 to 8

Step 1 – Association of CATS ESDs to EASp main Operational Issues

			EASP category								
ESD	Initiating event	GCOL	LOC-I	CFIT	MAC	RE-TO	RE-L				
1	Aircraft system failure					v					
2	ATC event					V					
3	Aircraft handling by flight crew inappropriate					V					
4	Aircraft directional control related systems failure					V					
5	Incorrect configuration		٧			٧					
6	Aircraft takes off with contaminated wing		V								
7	Aircraft weight and balance outside limits										
8	Aircraft encounters performance decreasing windshear after rotation		V								
9	Single engine failure					V					
10	Pitch control problem					V					
11	Fire on board aircraft		V								
12	Flight crew member spatially disorientated		٧								
13	Flight control system failure		V								
14	Flight crew incapacitation		v								
15	Anti-ice system not operating		٧								
16	Flight instrument failure		V								
17	Aircraft encounters adverse weather		٧								
18	Single engine failure		V								
19	Unstable approach		٧				٧				
21	Aircraft weight and balance outside limits		v								
23	Aircraft encounters windshear during approach/landing						V				
25	Aircraft handling by flight crew during flare inappropriate						٧				
26	Aircraft handling by flight crew during roll inappropriate						٧				
27	Aircraft direction control related systems failure						٧				
28	Single engine failure during landing										
29	Thrust reverser failure during landing										
30	Aircraft encounters unexpected wind										
31	Aircraft are positioned on collision course				٧						
32	Incorrect presence of aircraft/vehicle on runway in use	V									
33	Cracks in aircraft pressure cabin		V								
35	Flight crew decision error/operation of equipment error			V							
36	GCOL imminent	V									
37	Wake vortex encounter										
38	Loss of control due to poor airmanship		٧								

Source: ASCOS D3.2, p. 22, 23.

ESDs not present in CATS for ASCOS V0.1.xls - in red



Step 2 – Association of precursors and defences/controls when possible

Occurrences (Uneventful No. Deviations No. Deviations No. Defences/CONTROLS (Procedural/Flight Path)

Events)		(Procedural/Flight Path)		I
PRECURSORS				DEFENCES/CONTROLS
Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.	Prevention (Detection/Recovery)
Runway confusion	1			Pilot training, signs on the runway
Runway incursion	2			Airport security
Takeoff or landing on taxiway	3			Airstrip markings, ATM guidance, ILS operation
Airport confusion	4			Airport beacon, ATM guidance, Airport tower, navigation aids, GPS, TACAN
Wildlife incursion	5			Airport security program, active observation and deterrence of wildlife
Adverse weather / poor visibility conditions / darkness	6			Pilot training incl. IFR flights, ATM guidance, navigation aids, pilot training
Taxiway confusion	7			Tower guidance, taxiway marking, pilot training
Emergency landing	8			Aircraft maintenance, A, B, C, D-checks
Taxiway incursion	9			Airport security
Stand confusion	10			Tower guidance, taxiway marking, pilot training
inadequate anti-ice fluid holdover Time (HOT)	11			Maintenance staff training
Contaminated wing	12			Maintenance staff training, aircraft visual check prior to take-off
Continued unstabilized approach (failure to comply with go-around criteria and policy)	13			Pilot training, aircraft tracking by airport tower
AOA prevents missed approach	14			Pilot training
System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)	15			Aircraft maintenance checks
Gross loading error	16			Ground crew training, pilot inspection
Cargo loading unsecured / shift	17			Ground crew training, checklists, procedures
Convective weather encounter	18			Flight plan, weather forecast, weather radar, ATM guidance



Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.	DEFENCES/CONTROLS
Extreme turbulence encounter	19			Flight plan, weather forecast, weather radar, ATM guidance
Extreme icing conditions	20			Flight plan, weather forecast, weather
encounter				radar, ATM guidance
Windshear encounter	21			Flight plan, weather forecast, weather radar, ATM guidance
Volcanic ash encounter	22			Volcano activity observation, Flight plan, ATM guidance
Mountain wave / vortices encounter	23			Pilot training, Flight plan, weather forecast, weather radar, ATM guidance
Wake turbulence encounter	24			Pilot training, Flight plan, weather forecast, weather radar, ATM guidance
System failure affecting aircraft configuration, controllability and/or flying qualities	25			Aircraft maintenance checks, fail-safe design
System failure affecting the operation of primary instruments / displays or standby instruments	26			Aircraft maintenance checks, fail-safe design
Failures resulting in a non- standard fuel distribution	27			Aircraft maintenance checks, aircarft design
Uncommanded thrust asymmetry	28			Aircraft maintenance checks, aircarft design
In-flight smoke / fumes / fire (in cockpit, cabin, cargo) events that could affect the crew ability to conduct their duties and/or the aircraft controllability	29			Aircraft maintenance checks, aircarft design, security, maintenance staff training,
Adverse weather / poor visibility conditions	30			Pilot training, weather forecast, flight plan, ATM guidance, navigation aids
Extreme icing condition and / or heavy snow. Break in airport operation due to adverse weather or / and necessity of RWY surface maintenance.	31			Weather forecast, flight plan, navigation aids, Tower guidance
Convective weather / turbulence / windshear or crosswind conditions during take-off	32			Weather forecast, flight plan, navigation aids, Tower guidance
Cabin pressure drop as a result of aircraft structural failure	33			Aircraft maintenance checks, fail-safe design
Bird strike	34			Airport wildlife deterrence program
Turbulence encounter	35			Pilot training, wather forecast, flight plan,



Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.	DEFENCES/CONTROLS
				ATM guidance, navigation aids
Flight crew incapable in result of extreme turbulence	36			Seat belts, pilot physical and health tests,
Inadequate fuel quality / type	37			Daily fuel quality checks at FBO, tank
				markings, ground crew training
Crew is incapable in result of extreme turbulence	38			Seat belts, crew physical and health tests,
Contaminated Runway	39			Runway state monitoring, Airport safety program
Engine suffers severe surge	40			Pilot training, engine control system, engine design, engine maintenance
Severe failure of all engines on	41			Pilot training, engine control system,
transoceanic route or over rarely populated area				engine design, engine maintenance
Convective weather / turbulence / windshear / crosswind / icing conditions encounter during	42			Pilot training, weather forecast, flight plan, ATM guidance, navigation aids
approach and landing	42			Control designs with the residual to the
Crew is incapable in result of shock related to hard landing	43			Seat design, pilot physical tests
Missed approach execution	44			Pilot training, weather forecast, flight plan,
necessary after prolonged flight due to e. g. extreme weather				ATM guidance, navigation aids
Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate	45			Runway state monitoring, Airport safety program, weather forecast
Cautions / warnings (genuine or spurious) that may lead to a low-speed or high-speed rejected take-off	46			Avionics maintenance, design
Hard landing	47			Pilot training, ILS, Tower guidance,
Rejected takeoff (whether initiated below or above 100 kt)	48			Avionics maintenance, design
(+) due to an aircraft system failure including engine				
Severe structural failure of aircraft or / and its critical	49			Pilot training, ILS, Tower guidance, fail-safe design
systems resulted from design load exceeding during touchdown				ucsigii



Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.	DEFENCES/CONTROLS
GPWS / TAWS alert / warning	50			Pilot training, ATM and tower guidance,
(genuine or spurious)				flight plan, Navigation aids
MSAW warning	51			Pilot training, ATM and tower guidance,
				flight plan, Navigation aids
Other cases of reduced terrain	52			Pilot training, ATM and tower guidance,
separation				flight plan, ILS
Prolonged loss of	53			Communication Systems maintenance and
communications (PLOC) between				design,
pilot and controller(s)				
Low-energy state during	54			Pilot training, fly-by-wire/light
approach				
Land short (runway undershoot)	55			Pilot training, ILS, Tower guidance
event	33			Thot training, iES, Tower galactice
Low altitude pattern following a	56			Pilot training, Tower guidance, TCAS
go-around	30			Thot training, Tower guidance, Teas
Inappropriate low altitude	57			Pilot training, Tower guidance, TCAS
	37			Filot training, Tower guidance, TCAS
maneuvering	58			Dilat training flight planning
Low-on-fuel condition / fuel starvation	36			Pilot training, flight planning, communication with ATM
	59			
Crew incapacitation resulted from	39			Pilot health monitoring
illness (e.g. food poisoning)	60			Durana state manifesia
Natural or artificial obstacle on	60			Runway state monitoring
runway course	C1			Maintanana ataff tuaining databasa
Error in preparation of database for FMS	61			Maintenance staff training, database
	62			design, backups, database backlogs
Ground Navigational Aid failure	62			Equipment maintenance
Landing gear retraction failure	63			Undercarriage maintenance
Frontal surface encounter	64			wather forecast, pilot training, ATM
				guidance
Convective weather / turbulence	65			Tower guidance, wather forecast, pilot
/ windshear encounter conditions				training
during landing				
Midair collision	66			ATM guidance, radar, pilot training,
			-	procedures, transponder
Collision with ground obstacle	67			Runway state monitoring, TCAS, pilot
			+	training
Inadequate NOTAM information	68			ground installation maintenance
concerning ground navigational				
aid failure			1	
Inadequate navigational chart	69		1	air carrier organisation, pilot training
TCAS RA events (genuine or	70			Pilot training, navigational aids, ATM



Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.	DEFENCES/CONTROLS
spurious)				guidance
Airspace infringement	71			ATM guidance, radar, pilot training,
				procedures, transponder, air defence
Other cases of loss of separation	72			ATM guidance, radar, pilot training,
				procedures, transponder
Prolonged loss of communication (PLOC) between pilot and controller	73			Communication Systems maintenance and design,
Failures affecting TCAS operation	74			TCAS equipment maintenance
Convective weather - heavy rain resulted with wet RWY surface	75			runway state monitoring, airport safety program
Convective weather encounter in traffic intensive airport proximity	76			Weather forecast, Towe and ATM guidance
Engine failure	77			Engine maintenance, checks, design, pilot training
System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System	78			Display maintenance, checks, design, pilot training
Cabin pressure drop as a result of pneumatic system failure	79			Aircraft systems maintenance, checks, design
Tire burst	80			Tire maintenance, replacement, runway state monitoring
System failure affecting the operation of primary instruments / displays or standby instruments	26			Aircraft systems maintenance, checks, design
System failure affecting aircraft configuration, controllability and/or flying qualities	25			Aircraft systems maintenance, checks, design
Convective weather / turbulence / windshear / icing conditions encounter conditions during take-off risk	84			Weather forecast, flight plan, navigation aids, Tower guidance
Risk of dangerous occurences appeared during take-off roll	85			Pilot training, airport safety program
Convective weather / turbulence / strong wind encounter conditions during take-off	86			Weather monitoring, Tower guidance, pilot training
System failure affecting the operation of primary instruments / displays or standby instruments	26			Aircraft systems maintenance, checks, design



Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.	DEFENCES/CONTROLS
Contaminated Runway	39			Runway state monitoring
Takeoff from taxiway	90			Pilot training, Tower guidance, sterile
				cockpit
Runway confusion	91			Pilot training, Tower guidance, sterile
				cockpit
Inappropriate intersection takeoff	92			Pilot training, Tower guidance, sterile
or takeoff from incorrect				cockpit
intersection				
Line-up events	93			Towe guidance, pilot training
Rejected takeoff (whether	48			Aircraft systems maintenance, checks,
initiated below or above 100 kt)				design
(+) due to an aircraft system				
failure including engine				
Aircraft swerve / lateral excursion	96			Pilot traning, weather monitoring, fly-by-
during takeoff roll				wire/light
Cautions / warnings (genuine or	46			Avionics callibration, maintenance, design
spurious) that may lead to a low-				
speed or high-speed rejected				
take-off				
Other cockpit effects /	98			Avionics callibration, maintenance, design
malfunctions (genuine or				
spurious) occurring during takeoff				
roll				
Runway incursion	99			Airport security
Wild life incursion	100			Wildlife deterrence program
Bird strike	34			Wildlife deterrence program
Convective weather / turbulence	102			Weather monitoring, Tower guidance, pilot
/ windshear / crosswind				training
encounter during approach and				
landing				
Crew is incapable in result of	43			Seat design, pilot physical tests
shock related to hard landing				
Wild life incursion	100			Wildlife deterrence program
Convective weather / heavy rain	105			Weather monitoring, Tower guidance, pilot
				training
Severe structural failure of	49			Fail-safe design
aircraft or / and its critical				
systems resulted from design				
load exceeding during touchdown				
Missed approach execution	44			Weather monitoring, tower guidance, pilot
necessary after prolonged flight				training



Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.	DEFENCES/CONTROLS
due to e. g. extreme weather				
AOA prevents missed approach	14			Pilot training
Tire burst	80			Tire maintenance, replacement, runway
				state monitoring
Contaminated Runway	39			Runway state monitoring
Bird strike	34			Wildlife deterrence program
System failure affecting the	26			
operation of primary instruments				
/ displays or standby instruments				
Convective weather encounter	18			Weather monitoring, Flight plan,
				ATM/tower guidance, pilot training
Continued unstabilized approach	13			Pilot training, aircraft tracking, tower
(failure to comply with go-around				guidance, navigational aids
criteria and policy)				
Tailwind or crosswind landing	116			Weather monitoring, Tower guidance, pilot
with tailwind and/or crosswind				training
component(s) in excess of				
applicable limit(s), either				
intentionally or unknowingly				
Hard landing	47			Pilot training, ILS, Tower guidance
Bounced landing	118			Pilot training, aircraft design
Deep (long) landing	119			Pilot training, ILS, Tower guidance
Temporary loss of directional	120			Pilot training, aircraft design
control during rollout				
System failures that may affect	15			System maintenance, checks, design
braking devices (ground spoilers,				
brakes / autobrake, thrust				
reversers)				
System failures that may affect	122			System maintenance, checks, design
directional control (brakes, thrust				
reversers, nose wheel steering)				
Lack of adherence to SOP for	123			Pilot training, Tower guidance
take-off procedure in terms of				
maintaining adequate separation				
on the RWY.				
Flaws in manufacturer quality	124			POA certificate, quality checks at factory
control process - taxiing related				and customer level
control system (e.g. Brake failure)				
Lack of adherence to SOP for GND	125			Tower guidance, aircraft training, pilot
movements in terms of				traning



Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.	DEFENCES/CONTROLS
marshalling procedure				
Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication.	126			Tower guidance, aircraft training, pilot traning
Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	127			Tower guidance, aircraft training, pilot traning
Flaws in ground equipment maintenance process Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	128			Maintenance operation organisation, audits, staff training Work organisation, state labor regulations, unions, labor audits/inspections
Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130			Manuals, state regulations, audits
		Inadvertent deviation from cleared taxi route	131	Tower guidance, aircraft training, pilot traning
		Lack of English proficiency	132	Pilot qulification tests, training programmes, certificates
		Incorrect or confusing / misleading ATC instructions	133	ATC training
		Use of non-standard phraseology by pilot and/or controller	134	Air staff and ATM staff training
		Lack of adherence to emergency procedures - RWY collision avoidance	135	Pilot training, tower ATM training
		Flaws in aircraft system maintenance process definition - stickshaker	136	Process evaluation, multistage acceptance, voluntary reporting
		Traffic controller tiredness - Inadequate workload distribution	137	State labor regulations, labor unions, ATM work organisation
		Lack of adherence to SOP for GND movements. Poor execution of parking / docking	138	Pilot traning, tower guidance, aircraft tracking



Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.	DEFENCES/CONTROLS
		/pushback procedure		
		Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	139	Process evaluation, multistage acceptance, voluntary reporting
		Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications	140	Pilot traning, tower guidance, aircraft tracking
		Lack of adherence to SOP for GND movements.	141	Pilot traning, tower guidance, aircraft tracking
		Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.	142	Pilot traning, tower guidance, aircraft tracking
		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence	143	Pilot traning, tower guidance, aircraft tracking
		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity	144	Pilot traning, tower guidance, aircraft tracking
		Flaws in traffic controller requirements definition process and/or training methodology	145	Requirements evaluation, multistage acceptance, voluntary reporting
		Lack of or poor communication quality	146	Staff training, communication equipment reuirements, maintenance
		Lack of adherence to ICAO Annex 14 and related documents in terms of airside lights distribution	147	EU level and state level requirements, airport safety programme
		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	148	Staff training
		Flaws in maintenance technician / airworthiness	149	Requirements evaluation, multistage acceptance, voluntary reporting



Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.	DEFENCES/CONTROLS
		specialist requirements		
		definition process and/or		
		training methodology		
		Maintenance technician /	150	State labor regulations, labor unions, ATM
		airworthiness specialist		work organisation
		tiredness - Inadequate		
		workload distribution		
		Lack of adherence to the SOP in	151	Staff training
		terms of PNF flight parameters		
		/ situation monitoring or / and		
		passive contribution to the PF		
		duties		
		Inadequate stall recovery	152	Pilot training, fly-by-wire/light
		procedure for the aircraft		
		Inadequate management /	153	ATM training, pilot training
		separation of takeoffs and		
		landings		
		Callsign confusion	154	Alphabet pronunciation standards, staff
				training, communication equipment
				standards
		Current airport diagram not	155	CAA monitoring
		reflecting critical changes		
		Lack of adherence to SOP in	156	Staff training
		terms of awareness on		
		supporting systems (warning) -		
		RIMCAS.		
		Takeoff without clearance	157	Pilot training, pilot legal responsibility
		Landing without clearance	158	Pilot training, pilot legal responsibility
		Lack of adherence to	159	Pilot training, legal responsibility, tower
		emergency procedures - TWY /		guidance
		Apron collision avoidance		
		Lack of adherence to Rules of	160	Pilot training, legal responsibility, tower
		the Air - runway used for		guidance
		alternating take-offs and		
		landings		
		Inadequate certification	161	Multistage process acceptance, process
		process and / or flaws in		update
		methodology concerning		
		verification of the system /		
		product compliance with		
		requirements - stickshaker		



Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.	DEFENCES/CONTROLS
		system components		
		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162	CAA monitoring
		Lack of adherence to SOP in terms of ATCO and approach or ground controller communication	163	Staff training, organisation audits, CAA monitoring
		Unintuitive and / or error prone system manual - ground radar.	164	Voluntary reporting system, state authorities scrutiny
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground Radar	165	Multistage process acceptance, process update
		Lack of adherence to ICAO Annex 14 and related documents in terms of nonrestricted view on airsite from TWR	166	State regulations, norms, audits, certification
		Pilot tiredness - Inadequate workload distribution	167	Air carrier organisation, state labour rgulations, labour unions
		Flaws in pilot requirements definition process and/or training methodology	168	Voluntary reporting system, state authorities scrutiny
		Hearback ommitted	169	Voluntary reporting system, state authorities scrutiny
		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ground radar at the airport.	170	International and state regulations, norms, audits, certification and their updates
		Lack of adherence to SOP in terms of awareness on supporting systems (warning) - ground radar.	171	Staff training



Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.	DEFENCES/CONTROLS
		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of Runway Conflict Warning	172	International and state regulations, norms, audits, certification and their updates
		System. Lack of adherence to	173	Staff training
		emergency procedures - WEM Late activation of pedal braking or takeover from autobrake, when so required	174	Pilot training, qualification certification, cockpit design
		Delayed selection of reverse thrust	175	Pilot training, control design
		Late thrust reduction or power- on touchdown	176	Pilot training, control design
		Failure to arm ground-spoilers Inappropriate selection of autobrake mode for given runway length and condition	177 178	Pilot training, control design Pilot training, control design
		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment	179	Pilot training, system design, test, callibration
		Inadequate aircraft de-icing / anti-icing	180	Aircraft design, tests and certification
		Premature flaps / slats retraction (pilot's lapse or control lever confusion)	181	Pilot training, control design
		Aggressive maneuvering / overcontrolling	182	Pilot training, control design, fly-by- wire/light
		Excessive pitch attitude	183	Pilot training, control design, fly-by- wire/light
		Excessive bank angle	184	Pilot training, control design, fly-by- wire/light
		Flight below maneuvering speeds	185	Pilot training, control design, fly-by- wire/light
		Intentional or inadvertent approach to stall	186	Pilot training, control design, fly-by- wire/light, automatic slats
		High-altitude flying with low buffet-margin (excessive altitude and/or mach number for prevailing gross-weight and	187	Pilot training, flight plan acceptance



Occurrences (Uneventful	No.	Deviations	No.	DEFENCES/CONTROLS
Events)	I	(Procedural/Flight Path)	l	1
		turbulence conditions)		
		Excessive response to TCAS	188	Pilot training, fly-by-wire/light
		orders		
		Inadequate recovery from	189	Pilot training, fly-by-wire/light
		aircraft upset (uncommanded		
		pitch attitude or bank angle		
		excursion)		
		Low-energy state during	190	Pilot training, fly-by-wire/light, ILS, tower
		descent and approach		guidance
		Inadequate response to stall	191	Pilot training, publications of accident
		warning, GPWS warning, low-		reports
		energy alert (as applicable)		
		Incorrect use of automation -	192	Pilot training, publications of accident
		TOCW System		reports
		Go-around attempt after thrust	193	Pilot training, aircraft control design
		reversers deployment		
		Lack of effective pitch attitude	194	Pilot training, fly-by-wire/light
		and/or bank angle control		
		during go-around		
		Inappropriate low altitude	57	Pilot training, fly-by-wire/light
		maneuvering		
		Inadequate certification	196	Multistage process acceptance, process
		process and / or flaws in		update
		methodology concerning		
		verification of the system /		
		product compliance with		
		requirements -		
		marshalling/rolling/taxiing		
		control related system and		
		components (incl. brake)	467	6, 6,
		Lack of adherence to SOP in	197	Staff training, tower guidance
		terms of awareness on		
		supporting systems warning -		
		stickshaker Lack of adherence to SOP for	198	Staff training towar guidance cocknit
		take-off procedure in terms of	130	Staff training, tower guidance, cockpit design
		determining of aircraft		ucaigii
		configuration.		
		Poor application of T/O & RTO	199	Pilot training, tower guidance
		procedure, braking initiation	100	r not training, tower galdance



Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.	DEFENCES/CONTROLS
		sequence		
		Poor application of T/O & RTO	200	Pilot training, tower guidance
		procedure, use of MET / ATIS		
		information, aircraft handling		
		Lack of adherence to SOP for	201	Pilot training, tower guidance
		take-off procedure in terms of		G. G
		checking take-off configuration		
		before application of take-off		
		power.		
		Lack of adherence to AFM	202	Pilot training, aircraft control design
		limitations for Take-off		-
		Inadequate maintenance of	203	CAA monitoring, EU and state regulations,
		RWY. Lack of adherence to		voluntary reporting
		ICAO Annex 14 in terms of RWY		· · · -
		surface condition. Snow / ice		
		presence / or runway surface		
		friction rate below minimum		
		Flaws in aircraft system	204	Multistage process acceptance, process
		maintenance process definition		update
		- TOCW System		
		Inadequate certification	205	Multistage process acceptance, process
		process and / or flaws in		update
		methodology concerning		
		verification of the system /		
		product compliance with		
		requirements - RCWS		
		Inadequate maintenance of	203	CAA monitoring, EU and state regulations,
		RWY. Lack of adherence to		voluntary reporting
		ICAO Annex 14 in terms of RWY		
		surface condition. Snow / ice		
		presence / or runway surface		
		friction rate below minimum		
		Poor application of T/O & RTO	207	Pilot training, tower guidance
		procedure, adherence to SOP,		
		criteria for STOP decision		
		Poor application of T/O	208	Pilot training, aircraft control design
		procedure, use of MET / ATIS		
		information, aircraft de-icing		
		Poor application of T/O & RTO	209	Pilot training, tower guidance
		procedure, failure recognition		
		and preparedness		



Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.	DEFENCES/CONTROLS
		Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.	210	Pilot training
		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.	211	CAA monitoring, voluntary reporting
		Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT)	212	Staff training
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - antiice fluid HOT	213	Multistage process acceptance, process update
		Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared	214	Tower staff training
		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System.	215	International and state regulations, norms, audits, certification and their updates
		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.	216	Voluntary reporting system, CAA monitoring
		Unintuitive and / or error prone system manual - FMC	217	Voluntary monitoring, state regulations
		Lack of adherence to SOP in terms of fuelling procedure	218	Staff training
		Unintuitive and / or error prone system manual - TOCW	219	Voluntary monitoring, state regulations
		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of fire detection / warning or / and	220	International and state regulations, norms, audits, certification and their updates



Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.	DEFENCES/CONTROLS
		extinguishing system.		
		Inadequate effectivenes of fire extinguishing system	221	Certification, tests, Quality assurance
		Flaws in manufacturer quality control process - TOCW system components	222	Certification, tests, Quality assurance
		Use of non-standard phraseology by pilot flying (PF) and/or pilot not flying (PNF)	223	Pilot training, tower/ATM training
		Lack of adherence to the SOP in terms of critical indicators cross-checking	224	Staff training
		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).	225	CAA monitoring, state regulations
		Lack of adherence to the SOP in terms of critical maneuvre execution	226	Pilot training, fly-by-wire
		Lack of adherence to SOP in terms of AFM limitations	227	Pilot training, fly-by-wire
		Applied de-icing / anti-icing method is not sufficient for predicted conditions	228	Certification, tests, Quality assurance
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System	229	Multistage process acceptance, process update
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply	230	Multistage process acceptance, process update



Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.	DEFENCES/CONTROLS
		system components		
		Lack of adherence to SOP in	231	Pilot training, automation
		terms of aircraft icing		-
		monitoring		
		Lack of adherence to SOP in	232	Pilot training, automation
		terms of de-icing / anti-icing		
		procedures.		
		Lack of adherence to SOP	233	Staff training, audits, CAA monitoring, state
		during aircraft storage and / or		norms and regulations
		maintenance in terms of		
		protecting of critical aircraft		
		systems against contamination		
		Lack of adherence to SOP in	234	Staff training, reporting
		terms of requested information		
		support for other aircraft in		
		terms of current weather		
		conditions		
		Lack of adherence to SARPs in	235	Staff training, reporting, norms, CAA
		terms of avoiding adverse		monitoring
		weather conditions during		
		flight		
		Incorrect weather report	236	Weather forecast organisational quality
		obtained by the flight crew		assurance, forecast requirements, reliable
				source of forecasts
		Lack of adherence to SOP in	237	Staff training, reporting
		terms of providing flight crew		
		with current weather report	220	0.115.11
		Flaws in manufacturer quality	238	Certification, tests, norms
		control process - Power supply		
		system components Lack of adherence to SOP in	239	Staff training
		terms of application of findings	233	Start training
		from weather report		
		Lack of adherence of	240	Stward(ess) checks, request. Legal
		passengers to the		responsibility
		recommendation: Fasten seat		
		belt while seated		
		Lack of adherence to SOP in	241	Staff training
		terms of "fasten your seat belt"		



Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.	DEFENCES/CONTROLS
		information activation in passenger cabin during flight in turbulence conditions		
		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ECAM System.	242	International and state regulations, norms, audits, certification and their updates
		Error in calculation of necessary	243	Software quality assurance, tests, user training
		Lack of adherence to SOP in terms of awareness on supporting systems warning	244	Pilot training
		Lack of adherence to SOP in terms of approach and landing	245	Pilot training, responsibility, tower guidance
		Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing	246	Pilot training, responsibility, tower guidance to limited extent
		Lack of adherence to SOP for approach and landing	247	Pilot training, responsibility, tower guidance
		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path	248	International and state regulations, norms, audits, certification and their updates
		Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather.	249	CAA monitoring state norms and regulations.
		Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure	250	Pilot training
		Lack of adherence to AFM limitations for landing	251	Pilot training, fly-by-wire, information in cockpit for pilot
		Flaws in aircraft system maintenance process definition - Electrical wiring System	252	Quality assurance (e.g. FMEA), reporting systems, process update



Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.	DEFENCES/CONTROLS
		Inadequate certification	253	Multistage process acceptance, process
		process and / or flaws in		update
		methodology concerning		
		verification of the system /		
		product compliance with		
		requirements - PWS system		
		Lack of adherence to SOP in	254	Staff training, certification
		terms of necessary amount of		
		fuel		
		Lack of adherence to SOP in	255	Staff training, certification
		terms of load sheet preparation		
		and verification		
		Lack of adherence to the	256	International and state regulations, norms,
		current technology standards in		audits, certification and their updates
		terms of flight safety and		
		efficiency.		
		Lack of adherence to SOP in	257	Staff training, certification
		terms of AFM limitations in		
		terms of weigh and balance		
		Incorrect stab-trim setting	258	Staff training
		Undetected incorrect takeoff	259	Computerised checklist, external aircraft
		configuration		ground crew checks
		Poor application of T/O & RTO	260	Pilot training, software Q&A
		procedure, computation of T/O		
		parameters		
		Inadequate certification	261	Multistage process acceptance, process
		process and / or flaws in		update
		methodology concerning		
		verification of the system /		
		product compliance with		
		requirements - Ground		
		equipment		
		Gross error in takeoff weight	179	Staff training, software Q&A, error proof
		entry and/or in V1 / VR speeds		GUI
		assessment		
		Flaws in CRM training	263	Reporting system, procedure updates and
		procedures		evalutaion
		Lack of adherence to the main	264	Staff training
		CRM rules		
		Flaws in manufacturer quality	266	Certification, Recipient test. Report system.
		control process - Stickshaker		



Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.	DEFENCES/CONTROLS
		system components		
		Differece indications of	267	Callibration, mainenance, pre-flight check.
		independent aircraft attitude		
		indicators	250	0.66
		Flaws in aircraft system	268	Staff experience, reporting system, process
		maintenance process definition		evaluation and update
		- Braking system related components		
		Incorrect use of automation -	269	Pilot training, fool-proof design
		FMS	203	Thot truming, root proof design
		Flaws in aircraft system	270	Staff experience, reporting system, process
		maintenance process definition		evaluation and update
		- Communication equipment		
		systems and components.		
		Inadequate certification	271	Multistage process acceptance, process
		process and / or flaws in		update
		methodology concerning		
		verification of the system /		
		product compliance with		
		requirements - Communication		
		equipment systems and		
		components.		
		Flaws in manufacturer quality	272	Staff experience, reporting system, process
		control process -		evaluation and update
		Communication equipment		
		systems and components.		
		Lack of adherence to SOP in	273	Staff training
		terms of safety best practices		
		Altimeter setting error	274	Callibration, mainenance, pre-flight check.
		Failure to check navigation	275	Pilot training, routine
		accuracy before approach	276	Multistage process assertance process
		Inadequate certification	276	Multistage process acceptance, process
		process and / or flaws in		update
		methodology concerning verification of the system /		
		product compliance with		
		requirements - Rudder		
		components.		
		Flaws in aircraft system	277	Staff experience, reporting system, process
		maintenance process definition		evaluation and update



Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.	DEFENCES/CONTROLS
		- Rudder components.		
		Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain)	278	Pilot situational awarness, communication between pilot and ATM
		Flaws in manufacturer quality control process - Rudder components.	279	Staff experience, reporting system, copmponent evaluation and check
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Horizontal stabilizer components.	280	Multistage process acceptance, process update
		Premature descent to DA(H) before G/S intercept or premature descent to MDA(H) before final-descent-point / FAF	281	Aircraft tracking, ATM guidabnce, pilot instruments, training
		Premature descent below MDA(H) before reaching the visual-descent-point (VDP)	282	Aircraft tracking, ATM guidabnce, pilot instruments, training
		Flight below desired flight path during initial and/or final approach	283	ILS, glideslope, Aircraft tracking, Tower guidabnce, pilot instruments, training
		Continued approach, when below DA(H) or MDA(H), after loss of visual references	284	Aircraft tracking, Tower guidabnce, pilot instruments, training
		Flaws in aircraft system maintenance process definition - Horizontal stabilizer components.	285	Pre-flight checks, Staff experience, reporting system, process evaluation and update
		Late or inadequate response to MSAW warning	286	Pilot training
		Flaws in manufacturer quality control process - Horizontal stabilizer components.	287	Pre-flight checks, Staff experience, reporting system, process evaluation and update
		Inadequate certification process and / or flaws in methodology concerning	288	Multistage process acceptance, process update



Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.	DEFENCES/CONTROLS
		verification of the system /		
		product compliance with		
		requirements - Components of		
		Wing control surface system.		
		Failure to go-around, when so	289	Pilot training, communication with Tower,
		required		aircraft tracking
		Inadequate certification	290	Multistage process acceptance, process
		process and / or flaws in		update
		methodology concerning		
		verification of the system /		
		product compliance with		
		requirements - ACAS system		
		components		
		Failure to follow published	291	Pilot training, communication with Tower,
		missed-approach procedure		aircraft tracking
		Lack of adherence to AFM in	292	Pilot training
		terms of emergency procedures		
		- stall recovery		
		Lack of adherence to the	293	Certification, market pressure, CAA
		current technology standards in		monitoring, regulations update
		terms of flight safety		
		supporting systems. Lack of		
		GPWS		
		Lack of adherence to SOP for	294	Staff training, staff cooperation
		take-off procedure in terms of		
		altimeter callibration.		
		Lack of adherence to SARPs	295	National regulations update, CAA
		included in Annex 14 and		monitoring
		related documents in terms of		
		RWY parameters and location,		
		approach path parameters and		
		obstacles locations.		
		Lack of adherence to Rules of	296	Pilot training, staff training and
		the Air - adherence to		cooperation
		Controller clearance		
		Lack of adherence to TO	297	Pilot and maintenance training, staff
		procedure in terms of antiice		cooperation
		protection		
		Flaws in manufacturer quality	298	Certification of profuct and manufacturer,
		control process - PWS system		recipent test, reporting systems
		components		



Occurrences (Uneventful	No.	Deviations	No.	DEFENCES/CONTROLS	
Events)	INO.	(Procedural/Flight Path)	INO.	DEFENCES/CONTROLS	
		Inadequate certification	299	Multistage process acceptance, process	
		process and / or flaws in		update	
		methodology concerning			
		verification of the system /			
		product compliance with			
		requirements - FMS subsystems			
		and components (autopilot			
		incl.)			
		Tactical or / and Planning	300	State labor regulations, labor unions, work	
		Controller tiredness -		organisation, safety culture	
		Inadequate workload			
		distribution			
		Flaws in Tactical or / and	301	Multistage process acceptance, process	
		Planning Controller		update	
		requirements definition process			
		and/or training methodology			
		Lack of adherence to the	302	Certification, market pressure, CAA	
		current technology standards in		monitoring, regulations update	
		terms of flight safety			
		supporting systems. Lack of			
		MSAW system.			
		Lack of adherence to SOP. Lack	303	Staff training	
		of awareness and immidiate			
		answer on supporting systems			
		warning. Navigational aid			
		failure.			
		Imbalanced and inaproppriate	304	Staff training, organisation culture,	
		relation between cpt and his		management monitoring	
		subordinates			
		Unintuitive and / or error prone	305	Quality assurance (e.g. FMEA), customer	
		system manual -		feedback, market pressure	
		communication equipment.			
		Flaws in manufacturer quality	306	Certification, Recipient test, reporting	
		control process - FMS		system	
		subsystem and components			
		(autopilot incl.)			
		Lack of adherence to SOP for	307	Pilot and other staff training, staff	
		AIR operations in terms of		cooperation	
		controller error in approach			
		clearence instruction			



Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.	DEFENCES/CONTROLS
		Not recognized ground Navaids	308	Voluntary reporting systems, CAA
		System failure not reflected in	300	coperation with users
		NOTAM messages		coperation with asers
		Lack of adherence to SOP in	309	Staff training, safety culture, pre-flight
		terms of pre-flight inspections -	303	checks
		ice presence on aircraft		CHECKS
		Flaws in manufacturer quality	310	Certification, recipent tests
		control process - anti-ice fluid	310	Certification, recipent tests
		specifications (HOT)		
		Flaws in aircraft system	311	Staff avnoriones enfaty culture process
			311	Staff experience, safety culture, process
		maintenance process definition		evaluation and update
		- Components of Wing control		
		surface system.	212	Altitude monitoring various serves of
		Altitude deviation	312	Altitude monitoring, various sorces of
				information for pilot and ATM
		Level bust (pilot lapse or late	313	Pilota and ATC training
		re-clearance by ATC)		
		Flaws in manufacturer quality	314	Certification, recipent tests, audits
		control process - Components		
		of Wing control surface system.		
		Failure to comply with an	315	Pilot training, notification in instrument
		altitude or speed restriction /		
		constraint		
		Inadequate certification	316	Multistage process acceptance, process
		process and / or flaws in		update
		methodology concerning		
		verification of the system /		
		product compliance with		
		requirements - Autothrottle		
		system in the engine		
		Navigation deviation	317	Multiple information sources, GPS, nav
				beacons, ATM cooperation, pilot training
		Inappropriate visual avoidance	318	Pilot training
		maneuver		
		Flaws in aircraft system	319	Staff expertise, multistage process
		maintenance process definition		acceptance, process evaluation and update
		- ADI system components		
		Inadequate certification	320	Multistage process acceptance, process
		process and / or flaws in		update
		methodology concerning		
		verification of the system /		



Occurrences (Uneventful	N 1 -	Deviations	N 1 -	DEFENSES (CONTROLS
Events)	No.	(Procedural/Flight Path)	No.	DEFENCES/CONTROLS
		product compliance with		
		requirements - ADI system		
		components		
		Inadequate coordination	321	Audits, periodic evaluation and update
		between ATM centers and/or		
		ATC sectors		
		Flaws in manufacturer quality	322	Certification, recipent tests, audits
		control process - ADI system		
		components		
		Flaws in Airspace and Air Traffic	323	Consultations on design stage, evaluation
		planning procedures design		and update
		process		
		Flaws in manufacturer quality	324	Certification, recipent tests, audits
		control process - Autothrottle		
		system in the engine.		
		Flaws in aircraft system	325	Staff expertise, multistage process
		maintenance process definition		acceptance, process evaluation and update
		- Autothrottle system in the		
		engine.		
		Flaws in conflict and separation	326	Tests, evaluation, update
		minima infringement detection		
		/ elimination procedures		
		Lack of adherence of airlines to	327	Pressure to get permissions for operations,
		time contraints and deadlines		market pressure
		in terms of providing the		
		Network Manager Operation		
		Centre with obligatory data.		
		Inadequate certification	328	National regulations update, CAA
		process and / or flaws in		monitoring
		methodology concerning		
		verification of the system /		
		product compliance with		
		requirements - MTCD System		
		Lack of adherence of airlines to	329	Very high pressure to avoid financial and
		declared Flight Plan.		loss of pax godwill consequences
		Failure to identify the pre-	330	Staff training and experience
		tactical conflict before it reach		
		the tactical controller		
		Lack of adherence to SOP for	331	Piot training, aircarft tracking and ATM
		Airborne operation in terms of		cooperation
		minimum seprataion		



Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.	DEFENCES/CONTROLS
		Inadequate certification	332	Multistage process acceptance, process
		process and / or flaws in		update
		methodology concerning		
		verification of the system /		
		product compliance with		
		requirements - Thrust reverse		
		system in the engine.		
		Inadequate certification	333	Multistage process acceptance, process
		process and / or flaws in		update
		methodology concerning		
		verification of the system /		
		product compliance with		
		requirements - Hydraulic		
		system components		
		Flaws in aircraft system	334	Staff expertise, multistage process
		maintenance process definition		acceptance, process evaluation and update
		- Hydraulic System		
		Flaws in manufacturer quality	335	Certification, recipent test, audits
		control process - Thrust reverse		
		system in the engine.		
		Incorrect use of communication	336	Staff training, fool-proof design
		equipment		
		Flaws in aircraft system	337	Staff expertise, multistage process
		maintenance process definition		acceptance, process evaluation and update
		- Thrust reverse system in the		
		engine.		
		Lack of adherence to	338	Pilot training, equipment design, manual
		emergency procedures -		
		recovery from severe FCS		
		failure		
		Military activity in controlled	339	International agreements, government
		airport or located within		policies avoiding war, ATC airspace
		controlled area		monitoring, civil cooperation with air force
		General aviation activity in	340	Airport tower airspace monitoring,
		controlled airport or located		transponders installed in GA aircraft
		within controlled area		
		Inadequate certification	341	Multistage process acceptance, process
		process and / or flaws in		update
		methodology concerning		
		verification of the system /		
		product compliance with		



Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.	DEFENCES/CONTROLS
		requirements - Integrity of		
		primary aircraft structure.		
		Intensified traffic related to	342	Flight plan acceptance by authorities, AC
		general aviation activity e. g.		airspace monitoring, transponers in GA
		over GA airport / airfield		aircraft
		Deviation from flight trajectory	343	Aircraft tracking by ATM, transponders,
		commanded by controller		navigation aids, pilot training
		Lack of adherence to the	344	Certification, market pressure, regulations
		current technology standards in		update, CAA monitoring
		terms of flight safety		
		supporting systems. Lack of		
		STCA System.		
		Flaws in aircraft system	345	CAA monitoring, certification, staff
		maintenance and airworthiness		experience
		process definition - Integrity of		
		primary aircraft structure.		
		Lack of adherence to	346	Staff training
		regulations concerning		
		independent ATCO monitoring		
		Lack of adherence to the	347	Certification, market pressure, regulations
		current technology standards in		update, CAA monitoring
		terms of flight safety		
		supporting systems. Lack of		
		ACAS installed on aircraft.		
		Flaws in manufacturer quality	348	Certification of product and menufacturer,
		control process - Integrity of		market pressure, CAA monitoring, audits
		primary aircraft structure.	240	Staff training
		Late or inadequate response to ACAS warning	349	Staff training
		Lack of adherence to	350	Staff training
		emergency procedures - flight	330	Stan training
		deck smoke procedure		
		Inadequate certification	351	Multistage process acceptance, process
		process and / or flaws in	551	update
		methodology concerning		• • • • • • • • • • • • • • • • • • • •
		verification of the system /		
		product compliance with		
		requirements - STCA System		
		Inadequate certification	352	Multistage process acceptance, process
		process and / or flaws in		update



Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.	DEFENCES/CONTROLS
		methodology concerning		
		verification of the system /		
		product compliance with		
		requirements - Fuel system		
		components		
		Inadequate maintenance of fire	353	Maintenance staff training, audits
		vulnerable aircraft parts or	333	Mantenance starr training, addition
		components		
		Inadequate certification	354	Multistage process acceptance, process
		process and / or flaws in	33 .	update
		methodology concerning		apaace
		verification of the system /		
		product compliance with		
		requirements in terms of fire		
		resistance		
		Lack of adherence to the	355	Certification, market pressure, regulations
			333	
		current technology standards in		update, CAA monitoring
		terms of flight safety		
		supporting systems. Lack of		
		LLWAS System.	356	Multistage process accontance process
		Inadequate certification	330	Multistage process acceptance, process
		process and / or flaws in		update
		methodology concerning		
		verification of the system /		
		product compliance with requirements - LLWAS system		
			257	Dilat training instruments information aid
		Lack of adherence to AFM in	357	Pilot training, instruments information aid
		terms of emergency procedures		
		- windshear recovery	0=0	
		Inadequate certification	358	Multistage process acceptance, process
		process and / or flaws in		update
		methodology concerning		
		verification of the system /		
		product compliance with		
		requirements - Landing gear		
		components	0-1	0.60
		Lack of adherence to	359	Staff training, certification, audits
		regulations concerning		
		transport of DGR goods		
		Separation of structural	360	Aircraft certification, proper design,
		element / component of the		maintenance checks, maintenance



Occurrences (Uneventful	No.	Deviations	No.	DEFENCES/CONTROLS
Events)		(Procedural/Flight Path)		1
		aircraft during take-off or		certification
		landing		
		Flaws in aircraft system	361	Certification, regulations update
		maintenance process definition		
		- Fuel System		
		Excessive taxi speed	362	Pilot training, aircraft tracking by tower staff
		Inadequate technique for line-	363	Pilot training, tower cooperation
		up or 180-degree turnon		
		runway		
		Inadequate engine stand-up	364	Staff training
		technique		
		Flaws in manufacturer quality	365	Certification, market pressure
		control process -		
		marshalling/rolling/taxiing		
		control related system and		
		components (incl. brake).		
		Flaws in aircraft system	366	Certification, market pressure
		maintenance process definition		
		- marshalling/rolling/taxiing		
		control related system and		
		components (incl. brake).		
		Taxiing without clearance	367	Piot training, aircraft tracking by ATC
		Late rejected takeoff decision /	368	Staff training
		initiation		
		Premature rotation (i.e., below	369	Pilot training
		VR)		
		Late rotation (i.e., above VR)	370	Pilot training
		Slow rotation (i.e., low pitch	371	Pilot training
		rate)		
		Low pitch attitude after lift-off	372	Pilot training
		Flaws in manufacturer quality	373	Certification of product and menufacturer,
		control process - Pneumatic		market pressure, CAA monitoring, audits
		system componentss.		
		Flaws in aircraft system	374	CAA monitoring, certification, staff
		maintenance process definition		experience
		- Pneumatic system		
		components.		
		Inadequate certification	375	Multistage process acceptance, process
		process and / or flaws in		update
		methodology concerning		



Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.	DEFENCES/CONTROLS
		verification of the system /		
		product compliance with		
		requirements - Pneumatic		
		system components.		
		Flaws in manufacturer quality	376	Certification of product and menufacturer,
		control process - Landing gear		market pressure, CAA monitoring, audits
		components.		
		Flaws in aircraft system	377	CAA monitoring, certification, staff
		maintenance process definition		experience
		- Landing gear components.		
		Flaws in manufacturer quality	378	Certification of product and menufacturer,
		control process - Drag control		market pressure, CAA monitoring, audits
		system componentss.		
		Flaws in aircraft system	379	CAA monitoring, certification, staff
		maintenance process definition		experience
		- Drag control system		
		components.		
		Lack of adherence to SOP for	380	Pilot training, monitoring by ATC
		GND movements. Inadequate		
		application of call sign de-		
		confliction rules		
		Inadequate certification	381	Multistage process acceptance, process
		process and / or flaws in		update
		methodology concerning		
		verification of the system /		
		product compliance with		
		requirements - Drag control		
		system components.		
		Flaws in manufacturer quality	382	Certification of product and manufacturer,
		control process -other critical		market pressure, CAA monitoring, audits
		flight instruments and systems.		
		Flaws in aircraft system	383	CAA monitoring, certification, staff
		maintenance process definition		experience
		- other critical flight		
		instruments and systems.		
		Poor application of T/O & RTO	384	Pilot training, monitoring by ATC
		procedure, adherence to SOP		
		and AFM limitations		
		Inadequate certification	385	Multistage process acceptance, process
		process and / or flaws in		update
		methodology concerning		



Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.	DEFENCES/CONTROLS
		verification of the system /		
		product compliance with		
		requirements - other critical		
		flight instruments and systems.		
		Flaws in manufacturer quality	386	Certification of product and manufacturer,
		control process -Hydraulic		market pressure, CAA monitoring, audits
		system components.		
		Flaws in aircraft system	387	CAA monitoring, certification, staff
		maintenance process definition		experience
		- Power supply system		
		components		
		Poor application of T/O & RTO	388	Pilot training, computerised control aid,
		procedure, aircraft handling		monitoring by ATC
		Lack of adherence to the SOP in	389	Pilot training, monitoring by ATC
		terms of critical maneuvre		
		execution - flare		
		Extreme operation condition /	390	Maintenance certification, audits, CAA
		poor maintenance quality /		monitoring
		advanced life lenght		-
		Inadequate certification	391	Multistage process acceptance, process
		process and / or flaws in		update
		methodology concerning		
		verification of the system /		
		product compliance with		
		requirements - Aircraft door		
		system and / or components		
		Flaws in aircraft system	392	CAA monitoring, certification, staff
		maintenance process definition		experience
		- Aircraft door system and / or		
		components		
		Flaws in manufacturer quality	393	Certification of product and manufacturer,
		control process - Aircraft door		market pressure, CAA monitoring, audits
		system and / or components		
		Flaws in airport capacity	400	
		management process		
		Lack of adherence to SARPs	401	
		included in ICAO Annex 14 in		
		terms of airport fence integrity		
		monitoring		
		Lack of adherence to SOP for	404	
		take-off procedure in terms of		



Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.	DEFENCES/CONTROLS
		time limitation for take-off		
		preparation.		
		Lack of adherence to engine	409	Pilot training, certified computerised
		limitations		enginge management
		Flaws in aircraft system	410	CAA monitoring, certification, staff
		maintenance process definition		experience
		- FMS subsystems and		
		components (autopilot incl.)		
		Inadequate certification	411	Multistage process acceptance, process
		process and / or flaws in		update
		methodology concerning		
		verification of the system /		
		product compliance with		
		requirements - MSAW System		
		Descent above desired descent	412	Pilot training, instrument panel aids
		profile		
		High energy approach due to	413	Pilot training and experience
		lack of adequate planning or		
		due to challenging design of		
		STAR (high fix-crossing-		
		altitudes,) or challenging ATC		
		instructions (late descent,		
		vectors, altitude or speed		
		restrictions,)		
		Late deceleration and	414	Pilot training, ATC cooperation
		configuration set-up for		
		approach and landing		
		DME / ILS DME confusion in	415	Pilot training, multiple information source
		assessing the final descent		
		point / FAF		
		Unstabilized final approach (416	Pilot training, ILS, instrument panel aids
		high, fast, steep,)		
		Tailwind component above	417	ATC guidance, weather monitoring
		limit		
		Failure to remember / assess	418	ATC cooperation, pilot training
		crosswind component limit for		
		prevailing runway condition		
		Lack of adherence to SOP for	419	Staff training, ATC coopertation
		take-off procedure in terms of		
		speed bug checklist preparation		
		and verification.		



Occurrences (Uneventful	No.	Deviations	No.	DEFENCES/CONTROLS
Events)		(Procedural/Flight Path)	l	L
		Inadequate certification	420	Multistage process acceptance, process
		process and / or flaws in		update
		methodology concerning		
		verification of the system /		
		product compliance with		
		requirements - FCS system or		
		components		
		Flaws in manufacturer quality	421	Certification of product and menufacturer,
		control process - FCS system		market pressure, CAA monitoring, audits
		components		
		Flaws in aircraft system	422	CAA monitoring, certification, staff
		maintenance process definition		experience
		- FCS systems or components		
		Inappropriate continuation of	423	Pilot training, ATC cooperation
		landing after bounce		
		Inadequate bounce recovery	424	Pilot training
		technique		G
		Inadequate crosswind landing /	425	Pilot training
		decrab technique		g
		Long / floating flare	426	Pilot training
		Touchdown off centerline	427	Pilot training, ILS, instrument panel aids
		Long derotation	428	Pilot training
		Delayed selection of reverse	175	Pilot training
		thrust		
		Inappropriate use of differential	430	Pilot training, computerised control aid
		reverse thrust		
		Inadequate use of differential	432	Pilot training, computerised control aid
		braking		
		Use of nose wheel steering	433	Pilot training
		tiller during rollout		
		Vacating runway at excessive	434	Pilot training, ATC monitoring and
		speed for given turn-off angle		cooperation
		and surface condition		
		Lack of adherence to SOP in	246	Pilot training
		terms of briefing and checklist		-
		before initiating of approach		
		and landing		
		Lack of adherence to	448	Staff training
		emergency procedures	0	
		emergency procedures		



Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.	DEFENCES/CONTROLS
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components	454	Multistage process acceptance, process update
		Flaws in manufacturer quality control process - Engine systems and / or components	458	Certification of product and manufacturer, market pressure, CAA monitoring, audits
		Flaws in aircraft system maintenance process definition - Engine systems and / or components	463	CAA monitoring, certification, staff experience
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components	464	Multistage process acceptance, process update
		Flaws in manufacturer quality control process - APU systems and / or components	465	Certification of product and manufacturer, market pressure, CAA monitoring, audits
		Flaws in aircraft system maintenance process definition - APU systems and / or components	466	CAA monitoring, certification, staff experience
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Electrical / wiring system components	467	Multistage process acceptance, process update
		Flaws in manufacturer quality control process - Electrical / wiring systems components	468	Certification of product and manufacturer, market pressure, CAA monitoring, audits
		Flaws in supporting systems design and validations process - PWS System	469	Certification of product and manufacturer, market pressure, CAA monitoring, audits



Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.	DEFENCES/CONTROLS
		Flaws in aircraft system maintenance process definition - Fire detection system	474	CAA monitoring, certification, staff experience
		Inadequate certification process and / or flaws in methodology concerning verification of the system /	475	Multistage process acceptance, process update
		product compliance with requirements - Fire deection system components Flaws in manufacturer quality	476	Certification of product and manufacturer,
		control process - Fire detection system components		market pressure, CAA monitoring, audits
		Flaws in aircraft system maintenance process definition - Fire warning system	477	CAA monitoring, certification, staff experience
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system	478	Multistage process acceptance, process update
		Flaws in manufacturer quality control process - Fire warning system	479	Certification of product and manufacturer, market pressure, CAA monitoring, audits
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components	480	Multistage process acceptance, process update
		Flaws in aircraft system maintenance process definition - Fire extinguishing system components	481	CAA monitoring, certification, staff experience
		Flaws in manufacturer quality control process - Fire	482	Certification of product and manufacturer, market pressure, CAA monitoring, audits



Occurrences (Uneventful	No.	Deviations	No.	DEFENCES/CONTROLS
Events)	l I	(Procedural/Flight Path)	l .	I
		extinguishing system		
		components		
		Lack of adherence to AFM in	483	Staff training
		terms of emergency procedures		
		- fire detection and		
		extinguishing procedure		
		Unintuitive and / or error prone	484	Certification, market pressure, regulations
		system manual - fire		update, customer feedback
		extinguishing system		
		Flaws in aircraft system	485	CAA monitoring, certification, staff
		maintenance process definition		experience
		- GPWS system components		
		Inadequate certification	486	Multistage process acceptance, process
		process and / or flaws in		update
		methodology concerning		
		verification of the system /		
		product compliance with		
		requirements - GPWS system		
		components		
		Flaws in manufacturer quality	487	Certification of product and manufacturer,
		control process - GPWS system		market pressure, CAA monitoring, audits
		components		
		Flaws in aircraft system	488	CAA monitoring, certification, staff
		maintenance process definition		experience
		- Ground navigational systems		
		and components (e.g. ILS)		
		Inadequate certification	489	Multistage process acceptance, process
		process and / or flaws in		update
		methodology concerning		
		verification of the system /		
		product compliance with		
		requirements - Ground		
		navigational systems and		
		components (e.g. ILS)		
		Flaws in manufacturer quality	490	Certification of product and manufacturer,
		control process - Ground		market pressure, CAA monitoring, audits
		navigational systems and		, , , , , , , , , , , , , , , , , , , ,
		components (e.g. ILS)		
		Flaws in aircraft system	491	CAA monitoring, certification, staff
		maintenance process definition		experience
		- Onboard navigational systems		



Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.	DEFENCES/CONTROLS
		and components		
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492	Multistage process acceptance, process update
		Flaws in manufacturer quality control process - Onboard navigational systems and components.	493	Certification of product and manufacturer, market pressure, CAA monitoring, audits
		Unintuitive and / or error prone system manual - FMS	494	Certification, market pressure, regulations update, customer feedback
		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. MSAW warning.	495	Pilot training
		Flaws in manufacturer quality control process - CPCS system and / or components	496	Certification of product and manufacturer, market pressure, CAA monitoring, audits
		Flaws in aircraft system maintenance process definition - CPCS system and / or components	497	CAA monitoring, certification, staff experience
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - CPCS system and / or components	498	Multistage process acceptance, process update
		Incorrect use of automation - CPCS	499	Staff training, fool-proof design
		Unintuitive and / or error prone system manual - CPCS	500	Certification, market pressure, regulations update, customer feedback



No.

Step 3 – Link between updated precursors list and CATS ESDs (v0.1)

1	ESD1	ready	11	ESD11	ready	21	ESD21	ready	31	ESD31	ready
2	ESD2	ready	12	ESD12	ready	22	ESD22	n/a in v0.1	32	ESD32	ready
3	ESD3	ready	13	ESD13	ready	23	ESD23	ready	33	ESD33	n/a in v0.1
4	ESD4	ready	14	ESD14	ready	24	ESD24	n/a in v0.1	34	ESD34	n/a in v0.1
5	ESD5	ready	15	ESD15	ready	25	ESD25	ready	35	ESD35	ready
6	ESD6	ready	16	ESD16	ready	26	ESD26	ready	36	ESD36	ready
7	ESD7	in ESD10	17	ESD17	ready	27	ESD27	ready	37	ESD37	in ESD17
8	ESD8	ready	18	ESD18	ready	28	ESD28	in ESD27	38	ESD38	n/a in v0.1
9	ESD9	ready	19	ESD19	ready	29	ESD29	In ESD27			
10	ESD10	ready	20	ESD20	n/a in v0.1	30	ESD30	In ESD26		·	

Deviations (Procedural/Flight Path)

Basing on CATS for ASCOS v0.1.xls and ASCOS D3.2, p. 120, 121

Occurrences (Uneventful Events)

ESD

ESDs not present in CATS for ASCOS v0.1.xls or marked as "included in ESD ASC-..." - in red

No.

CATS **PRECURSORS** v0.1 **Occurrences (Uneventful Events)** No. **Deviations (Procedural/Flight Path)** No. ESD1 System failure affecting the operation of 26 Unintuitive and / or error prone system manual 500 1 primary instruments / displays or standby - CPCS instruments 2 System failure affecting aircraft 25 Poor application of T/O & RTO procedure, 209 configuration, controllability and/or flying failure recognition and preparedness 3 Prolonged loss of communications (PLOC) Poor application of T/O & RTO procedure, 53 260 between pilot and controller(s) computation of T/O parameters 4 Other cockpit effects / malfunctions Poor application of T/O & RTO procedure, 199 98 (genuine or spurious) occurring during braking initiation sequence takeoff roll Poor application of T/O & RTO procedure. 207 5 Landing gear retraction failure 63 adherence to SOP, criteria for STOP decision 6 Engine failure 77 Pilot tiredness - Inadequate workload 167 distribution 7 Convective weather - heavy rain resulted 317 75 Navigation deviation with wet RWY surface 8 Contaminated Runway 39 Maintenance technician / airworthiness 150 specialist tiredness - Inadequate workload distribution 9 Cabin pressure drop as a result of 79 Lack of or poor communication quality 146 pneumatic system failure 10 Lack of adherence to ICAO Annex 14 SARPs in 216 terms of RWY mainternance - presence of contaminations. 11 Inadequate maintenance of RWY. Lack of 203 adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum Inadequate certification process and / or flaws 12 230 in methodology concerning verification of the system / product compliance with requirements - Power supply system components



	ESD	Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.
13				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Pneumatic system components.	375
14				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - other critical flight instruments and systems.	385
15				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492
16				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
17				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components	333
18				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299
19				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system	478
20				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components	480
21				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components	475
22				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Drag control system components.	381
23				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.	288



	ESD	Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.
24				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.	271
25				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine	316
26				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components	464
27				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components	391
28				Inadequate aircraft de-icing / anti-icing	180
29				High energy RTO rate is an indicator of improper Operator's policy for T/O operations.	211
30				Gross error in takeoff weight entry and/or in V1 / VR speeds assessment	179
31				Flaws in pilot requirements definition process and/or training methodology	168
32				Flaws in manufacturer quality control process - Hydraulic system components.	386
33				Flaws in manufacturer quality control process - Power supply system components	238
34				Flaws in manufacturer quality control process - Pneumatic system componentss.	373
35				Flaws in manufacturer quality control process - Onboard navigational systems and components.	493
36				Flaws in manufacturer quality control process - Landing gear components.	376
37				Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)	306
38				Flaws in manufacturer quality control process - Fire warning system	479
39				Flaws in manufacturer quality control process - Fire extinguishing system components	482
40				Flaws in manufacturer quality control process - Fire detection system components	476
41				Flaws in manufacturer quality control process - Drag control system componentss.	378
42				Flaws in manufacturer quality control process - Components of Wing control surface system.	314
43				Flaws in manufacturer quality control process - Communication equipment systems and components.	272



	ESD	Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.
44				Flaws in manufacturer quality control process - Autothrottle system in the engine.	324
45				Flaws in manufacturer quality control process - APU systems and / or components	465
46				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
47				Flaws in aircraft system maintenance process definition - Power supply system components	387
48				Flaws in aircraft system maintenance process definition - Pneumatic system components.	374
49				Flaws in aircraft system maintenance process definition - other critical flight instruments and systems.	383
50				Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491
51				Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake).	366
52				Flaws in aircraft system maintenance process definition - Landing gear components.	377
53				Flaws in aircraft system maintenance process definition - Hydraulic System	334
54				Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)	410
55				Flaws in aircraft system maintenance process definition - Fire warning system	477
56				Flaws in aircraft system maintenance process definition - Fire extinguishing system components	481
57				Flaws in aircraft system maintenance process definition - Fire detection system components	474
58				Flaws in aircraft system maintenance process definition - Drag control system components.	379
59				Flaws in aircraft system maintenance process definition - Components of Wing control surface system.	311
60				Flaws in aircraft system maintenance process definition - Communication equipment systems and components.	270
61				Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.	325
62				Flaws in aircraft system maintenance process definition - APU systems and / or components	466
101	ESD2	Wildlife incursion	5	Use of non-standard phraseology by pilot and/or controller	134
102		System failure affecting aircraft configuration, controllability and/or flying qualities	25	Traffic controller tiredness - Inadequate workload distribution	137



	ESD	Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.
103		Risk of dangerous occurences appeared during take-off roll	85	Taxiing without clearance	367
104		Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	127	Takeoff without clearance	157
105		Emergency landing	8	Poor application of T/O & RTO procedure, computation of T/O parameters	260
106		Convective weather / turbulence / windshear or crosswind conditions during take-off	32	Poor application of T/O & RTO procedure, braking initiation sequence	199
107		Convective weather - heavy rain resulted with wet RWY surface	75	Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207
108		Contaminated Runway	39	Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations	384
109		Bird strike	34	Pilot tiredness - Inadequate workload distribution	167
110				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
111				Late rejected takeoff decision / initiation	368
112				Landing without clearance	158
113				Lack of or poor communication quality	146
114				Lack of English proficiency	132
115				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
116				Lack of adherence to the main CRM rules	264
117				Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	148
118				Lack of adherence to SOP for take-off procedure in terms of time limitation for take-off preparation.	404
119				Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.	142
120				Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications	140
121				Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence	143
122				Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity	144
123				Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401
124				Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	160
125				Lack of adherence to Rules of the Air - adherence to Controller clearance	296



	ESD	Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.
126				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162
127				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.	216
128				Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	139
129				Incorrect or confusing / misleading ATC instructions	133
130				Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum	203
131				High energy RTO rate is an indicator of improper Operator's policy for T/O operations.	211
132				Gross error in takeoff weight entry and/or in V1 / VR speeds assessment	179
133				Flaws in traffic controller requirements definition process and/or training methodology	145
134				Flaws in pilot requirements definition process and/or training methodology	168
135				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
136				Flaws in CRM training procedures	263
137				Flaws in Airspace and Air Traffic planning procedures design process	323
138				Flaws in airport capacity management process	400
139				Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake).	366
201	ESD3	System failure affecting aircraft configuration, controllability and/or flying qualities	25	Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling	200
202		Convective weather / turbulence / windshear or crosswind conditions during take-off	32	Poor application of T/O & RTO procedure, computation of T/O parameters	260
203		Convective weather - heavy rain resulted with wet RWY surface	75	Poor application of T/O & RTO procedure, braking initiation sequence	199
204		Contaminated Runway	39	Poor application of T/O & RTO procedure, aircraft handling	388
205		Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate	45	Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207
206				Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations	384
207				Pilot tiredness - Inadequate workload distribution	167



	ESD	Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.
208				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
209				Late rejected takeoff decision / initiation	368
210				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
211				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.	216
212				Lack of adherence to AFM limitations for Take- off	202
213				Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum	203
214				High energy RTO rate is an indicator of improper Operator's policy for T/O operations.	211
215				Gross error in takeoff weight entry and/or in V1 / VR speeds assessment	179
216				Flaws in pilot requirements definition process and/or training methodology	168
217				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
218				Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake).	366
219				Failure to remember / assess crosswind component limit for prevailing runway condition	418
301	ESD4	Tire burst	80	Poor application of T/O & RTO procedure, failure recognition and preparedness	209
302		System failure affecting aircraft configuration, controllability and/or flying qualities	25	Poor application of T/O & RTO procedure, computation of T/O parameters	260
303		Convective weather - heavy rain resulted with wet RWY surface	75	Poor application of T/O & RTO procedure, braking initiation sequence	199
304		Contaminated Runway	39	Poor application of T/O & RTO procedure, aircraft handling	388
305				Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207
306				Pilot tiredness - Inadequate workload distribution	167
307				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
308				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.	216



	ESD	Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.
309				Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum	203
310				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake)	196
311				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
312				High energy RTO rate is an indicator of improper Operator's policy for T/O operations.	211
313				Gross error in takeoff weight entry and/or in V1 / VR speeds assessment	179
314				Flaws in pilot requirements definition process and/or training methodology	168
315				Flaws in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake).	365
316				Flaws in manufacturer quality control process - Landing gear components.	376
317				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
318				Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake).	366
319				Flaws in aircraft system maintenance process definition - Landing gear components.	377
401	ESD5	System failure affecting the operation of primary instruments / displays or standby instruments	26	Unintuitive and / or error prone system manual - TOCW	219
402		System failure affecting aircraft configuration, controllability and/or flying qualities	25	Unintuitive and / or error prone system manual - ground radar.	164
403		Extreme icing conditions encounter	20	Unintuitive and / or error prone system manual - FMC	217
404		Contaminated wing	12	Undetected incorrect takeoff configuration	259
405		Cautions / warnings (genuine or spurious) that may lead to a low-speed or high-speed rejected take-off	46	Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing	208
406		Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate	45	Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling	200
407				Poor application of T/O & RTO procedure, braking initiation sequence	199
408				Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207



	ESD	Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.
409				Pilot tiredness - Inadequate workload distribution	167
410				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
411				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
412				Lack of adherence to SOP in terms of de-icing / anti-icing procedures.	232
413				Lack of adherence to SOP in terms of awareness on supporting systems warning - stickshaker	197
414				Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT)	212
415				Lack of adherence to SOP in terms of aircraft icing (condition) monitoring	231
416				Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.	210
417				Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.	198
418				Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201
419				Lack of adherence to AFM in terms of emergency procedures - stall recovery	292
420				Incorrect use of automation - TOCW System	192
421				Incorrect stab-trim setting	258
422				Inadequate stall recovery procedure for the aircraft	152
423				Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum	203
424				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System	229
425				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - stickshaker system components	161
426				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components	230
427				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - antiice fluid HOT	213
	1		+	Inadequate aircraft de-icing / anti-icing	180



	ESD	Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.
429				High energy RTO rate is an indicator of improper Operator's policy for T/O operations.	211
430				Gross error in takeoff weight entry and/or in V1 / VR speeds assessment	179
431				Flaws in pilot requirements definition process and/or training methodology	168
432				Flaws in manufacturer quality control process - TOCW system components	222
433				Flaws in manufacturer quality control process - Stickshaker system components	266
434				Flaws in manufacturer quality control process - Power supply system components	238
435				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
436				Flaws in aircraft system maintenance process definition - TOCW System	204
437				Flaws in aircraft system maintenance process definition - stickshaker	136
438				Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake).	366
439				Flaws in aircraft system maintenance process definition - Electrical wiring System	252
440				Flaws in aircraft system maintenance process definition - Braking system related components	268
441				Applied de-icing / anti-icing method is not sufficient for predicted conditions	228
501	ESD6	Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129	Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing	208
502		System failure affecting the operation of primary instruments / displays or standby instruments	26	Pilot tiredness - Inadequate workload distribution	167
503		inadequate anti-ice fluid holdover Time (HOT)	11	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
504		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130	Lack of adherence to TO procedure in terms of antiice protection	297
505		Extreme icing conditions encounter	20	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
506		Extreme icing condition and / or heavy snow. Break in airport operation due to adverse weather or / and necessity of RWY surface maintenance.	31	Lack of adherence to SOP in terms of pre-flight inspections - ice presence on aircraft	309
507		Convective weather encounter	18	Lack of adherence to SOP in terms of awareness on supporting systems warning - stickshaker	197
508		Contaminated wing	12	Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT)	212



	ESD	Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.
509		Adverse weather / poor visibility conditions / darkness	6	Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.	210
510				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - stickshaker system components	161
511				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - antiice fluid HOT	213
512				Inadequate aircraft de-icing / anti-icing	180
513				Flaws in pilot requirements definition process and/or training methodology	168
514				Flaws in manufacturer quality control process - Stickshaker system components	266
515				Flaws in manufacturer quality control process - anti-ice fluid specifications (HOT)	310
516				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
517				Flaws in aircraft system maintenance process definition - stickshaker	136
518				Applied de-icing / anti-icing method is not sufficient for predicted conditions	228
701	ESD8	System failure affecting the operation of primary instruments / displays or standby instruments	26	Traffic controller tiredness - Inadequate workload distribution	137
702		Frontal surface encounter	64	Pilot tiredness - Inadequate workload distribution	167
703		Convective weather encounter	18	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
704		Convective weather / turbulence / windshear or crosswind conditions during take-off	32	Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System.	215
705				Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.	355
706				Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared	214
707				Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).	225
708				Lack of adherence to emergency procedures - WEM	173
709				Lack of adherence to AFM in terms of emergency procedures - windshear recovery	357
710				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system	253



	ESD	Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.
711				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - LLWAS system	356
712				Flaws in traffic controller requirements definition process and/or training methodology	145
713				Flaws in pilot requirements definition process and/or training methodology	168
714				Flaws in manufacturer quality control process - PWS system components	298
715				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
801	ESD9	Wildlife incursion	5	Poor application of T/O & RTO procedure, failure recognition and preparedness	209
802		Tire burst	80	Poor application of T/O & RTO procedure, computation of T/O parameters	260
803		System failure affecting aircraft configuration, controllability and/or flying qualities	25	Poor application of T/O & RTO procedure, braking initiation sequence	199
804		Convective weather - heavy rain resulted with wet RWY surface	75	Poor application of T/O & RTO procedure, aircraft handling	388
805		Contaminated Runway	39	Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207
806		Bird strike	34	Pilot tiredness - Inadequate workload distribution	167
807				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
808				Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401
809				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162
810				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.	216
811				Lack of adherence to AFM in terms of emergency procedures - stall recovery	292
812				Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum	203
813				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
814				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components	454



	ESD	Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.
815				High energy RTO rate is an indicator of improper Operator's policy for T/O operations.	211
816				Gross error in takeoff weight entry and/or in V1 / VR speeds assessment	179
817				Flaws in pilot requirements definition process and/or training methodology	168
818				Flaws in manufacturer quality control process - Landing gear components.	376
819				Flaws in manufacturer quality control process - Engine systems and / or components	458
820				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
821				Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake).	366
822				Flaws in aircraft system maintenance process definition - Landing gear components.	377
823				Flaws in aircraft system maintenance process definition - Engine systems and / or components	463
901	ESD10	Wildlife incursion	5	Slow rotation (i.e., low pitch rate)	371
902		Tire burst	80	Poor application of T/O & RTO procedure, failure recognition and preparedness	209
903		System failure affecting the operation of primary instruments / displays or standby instruments	26	Poor application of T/O & RTO procedure, computation of T/O parameters	260
904		System failure affecting aircraft configuration, controllability and/or flying qualities	25	Poor application of T/O & RTO procedure, braking initiation sequence	199
905		Convective weather - heavy rain resulted with wet RWY surface	75	Poor application of T/O & RTO procedure, aircraft handling	388
906		Contaminated Runway	39	Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207
907		Bird strike	34	Pilot tiredness - Inadequate workload distribution	167
908				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
909				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
910				Lack of adherence to SOP for take-off procedure in terms of speed bug checklist preparation and verification.	419
911				Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.	198
912				Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201



	ESD	Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.
913				Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401
914				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162
915				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.	216
916				Incorrect stab-trim setting	258
917				Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum	203
918				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
919				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FCS system or components	420
920				High energy RTO rate is an indicator of improper Operator's policy for T/O operations.	211
921				Gross error in takeoff weight entry and/or in V1 / VR speeds assessment	179
922				Flaws in pilot requirements definition process and/or training methodology	168
923				Flaws in manufacturer quality control process - Landing gear components.	376
924				Flaws in manufacturer quality control process - FCS system components	421
925				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
926				Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake).	366
927				Flaws in aircraft system maintenance process definition - Landing gear components.	377
928				Flaws in aircraft system maintenance process definition - FCS systems or components	422
1001	ESD11	Wildlife incursion	5	Unintuitive and / or error prone system manual - fire extinguishing system	484
1002		Volcanic ash encounter	22	Separation of structural element / component of the aircraft during take-off or landing	360
1003		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129	Pilot tiredness - Inadequate workload distribution	167
1004		Midair collision	66	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150



	ESD	Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.
1005		In-flight smoke / fumes / fire (in cockpit, cabin, cargo) events that could affect the crew ability to conduct their duties and/or the aircraft controllability	29	Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of fire detection / warning or / and extinguishing system.	220
1006		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130	Lack of adherence to SOP in terms of fuelling procedure	218
1007		Contaminated Runway	39	Lack of adherence to regulations concerning transport of DGR goods	359
1008		Collision with ground obstacle	67	Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.	216
1009		Cargo loading unsecured / shift	17	Lack of adherence to engine limitations	409
1010				Lack of adherence to AFM in terms of emergency procedures - fire detection and extinguishing procedure	483
1011				Inadequate maintenance of fire vulnerable aircraft parts or components	353
1012				Inadequate effectivenes of fire extinguishing system	221
1013				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements in terms of fire resistance	354
1014				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components	333
1015				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fuel system components	352
1016				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system	478
1017				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components	480
1018				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components	475
1019				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components	454
1020				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Electrical / wiring system components	467



	ESD	Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.
1021				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components	464
1022				Flaws in pilot requirements definition process and/or training methodology	168
1023				Flaws in manufacturer quality control process - Fire warning system	479
1024				Flaws in manufacturer quality control process - Fire extinguishing system components	482
1025				Flaws in manufacturer quality control process - Fire detection system components	476
1026				Flaws in manufacturer quality control process - Engine systems and / or components	458
1027				Flaws in manufacturer quality control process - Electrical / wiring systems components	468
1028				Flaws in manufacturer quality control process - APU systems and / or components	465
1029				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
1030				Flaws in aircraft system maintenance process definition - Hydraulic System	334
1031				Flaws in aircraft system maintenance process definition - Fuel system compoonents	361
1032				Flaws in aircraft system maintenance process definition - Fire warning system	477
1033				Flaws in aircraft system maintenance process definition - Fire extinguishing system components	481
1034				Flaws in aircraft system maintenance process definition - Fire detection system components	474
1035				Flaws in aircraft system maintenance process definition - Engine systems and / or components	463
1036				Flaws in aircraft system maintenance process definition - Electrical wiring System	252
1037				Flaws in aircraft system maintenance process definition - APU systems and / or components	466
1101	ESD12	System failure affecting the operation of primary instruments / displays or standby instruments	26	Use of non-standard phraseology by pilot flying (PF) and/or pilot not flying (PNF)	223
1102		Adverse weather / poor visibility conditions / darkness	6	Unintuitive and / or error prone system manual - FMS	494
1103				Pilot tiredness - Inadequate workload distribution	167
1104				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
1105				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151



	ESD	Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.
1106				Lack of adherence to the SOP in terms of critical maneuvre execution	226
1107				Lack of adherence to the SOP in terms of critical indicators cross-checking	224
1108				Lack of adherence to SOP in terms of safety best practices	273
1109				Lack of adherence to SOP in terms of AFM limitations	227
1110				Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).	225
1111				Lack of adherence to AFM in terms of emergency procedures - stall recovery	292
1112				Incorrect use of automation - FMS	269
1113				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299
1114				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ADI system components	320
1115				Flaws in pilot requirements definition process and/or training methodology	168
1116				Flaws in manufacturer quality control process - ADI system components	322
1117				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
1118				Flaws in aircraft system maintenance process definition - ADI system components	319
1119				Excessive pitch attitude	183
1120				Excessive bank angle	184
1121				Difference indications of independent aircraft speed / altitude or attitude indicators	267
1122				Aggressive maneuvering / overcontrolling	182
1201	ESD13	Uncommanded thrust asymmetry	28	Pilot tiredness - Inadequate workload distribution	167
1202		System failure affecting the operation of primary instruments / displays or standby instruments	26	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
1203		System failure affecting aircraft configuration, controllability and/or flying qualities	25	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
1204				Lack of adherence to the SOP in terms of critical indicators cross-checking	224
1205				Lack of adherence to emergency procedures - recovery from severe FCS failure	338



	ESD	Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.
1206				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Thrust reverse system in the engine.	332
1207				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Rudder components.	276
1208				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Horizontal stabilizer components.	280
1209				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299
1210				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.	288
1211				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine	316
1212				Flight below maneuvering speeds	185
1213				Flaws in pilot requirements definition process and/or training methodology	168
1214				Flaws in manufacturer quality control process - Thrust reverse system in the engine.	335
1215				Flaws in manufacturer quality control process - Rudder components.	279
1216				Flaws in manufacturer quality control process - Horizontal stabilizer components.	287
1217				Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)	306
1218				Flaws in manufacturer quality control process - Components of Wing control surface system.	314
1219				Flaws in manufacturer quality control process - Autothrottle system in the engine.	324
1220				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
1221				Flaws in aircraft system maintenance process definition - Thrust reverse system in the engine.	337
1222				Flaws in aircraft system maintenance process definition - Rudder components.	277
1223				Flaws in aircraft system maintenance process definition - Horizontal stabilizer components.	285



	ESD	Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.
1224				Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)	410
1225				Flaws in aircraft system maintenance process definition - Components of Wing control surface system.	311
1226				Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.	325
1301	ESD14	Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129	Use of non-standard phraseology by pilot and/or controller	134
1302		System failure affecting the operation of primary instruments / displays or standby instruments	26	Unintuitive and / or error prone system manual - CPCS	500
1303		System failure affecting aircraft configuration, controllability and/or flying qualities	25	Traffic controller tiredness - Inadequate workload distribution	137
1304		In-flight smoke / fumes / fire (in cockpit, cabin, cargo) events that could affect the crew ability to conduct their duties and/or the aircraft controllability	29	Pilot tiredness - Inadequate workload distribution	167
1305		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
1306		Extreme turbulence encounter	19	Lack of English proficiency	132
1307		Crew incapacitation resulted from illness (e.g. food poisoning)	59	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
1308		Cabin pressure drop as a result of aircraft structural failure	33	Lack of adherence to the SOP in terms of critical maneuvre execution - flare	389
1309		Bird strike	34	Lack of adherence to SOP for GND movements.	141
1310		Adverse weather / poor visibility conditions / darkness	6	Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162
1311				Lack of adherence to emergency procedures - flight deck smoke procedure	350
1312				Incorrect use of automation - CPCS	499
1313				Incorrect or confusing / misleading ATC instructions	133
1314				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Integrity of primary aircraft structure.	341
1315				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - CPCS system and / or components	498



	ESD	Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.
1316				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components	391
1317				Flaws in traffic controller requirements definition process and/or training methodology	145
1318				Flaws in pilot requirements definition process and/or training methodology	168
1319				Flaws in manufacturer quality control process - CPCS system and / or components	496
1320				Flaws in manufacturer quality control process - Integrity of primary aircraft structure.	348
1321				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
1322				Flaws in aircraft system maintenance process definition - CPCS system and / or components	497
1323				Flaws in aircraft system maintenance process definition - Aircraft door system and / or components	392
1324				Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.	345
1325				Extreme operation condition / poor maintenance quality / advanced life lenght	390
1401	ESD15	System failure affecting the operation of primary instruments / displays or standby instruments	26	Unintuitive and / or error prone system manual - Anti-icing system	397
1402		System failure affecting aircraft configuration, controllability and/or flying qualities	25	Pilot tiredness - Inadequate workload distribution	167
1403		Extreme icing conditions encounter	20	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
1404				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
1405				Lack of adherence to the SOP in terms of critical indicators cross-checking	224
1406				Lack of adherence to SOP in terms of de-icing / anti-icing procedures.	232
1407				Lack of adherence to SOP in terms of aircraft icing (condition) monitoring	231
1408				Lack of adherence to AFM in terms of emergency procedures - stall recovery	292
1409				Incorrect use of automation - Anti-icing system	265
1410				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FCS system or components	420



	ESD	Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.
1411				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Anti-icing system components	394
1412				Inadequate aircraft de-icing / anti-icing	180
1413				Flaws in pilot requirements definition process and/or training methodology	168
1414				Flaws in manufacturer quality control process - FCS system components	421
1415				Flaws in manufacturer quality control process - Anti-icing system components	395
1416				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
1417				Flaws in aircraft system maintenance process definition - FCS systems or components	422
1418				Flaws in aircraft system maintenance process definition - Anti-icing systems components	396
1419				Excessive pitch attitude	183
1501	ESD16	Volcanic ash encounter	22	Pilot tiredness - Inadequate workload distribution	167
1502		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
1503		System failure affecting the operation of primary instruments / displays or standby instruments	26	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
1504		System failure affecting aircraft configuration, controllability and/or flying qualities	25	Lack of adherence to the SOP in terms of critical indicators cross-checking	224
1505		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130	Lack of adherence to SOP in terms of pre-flight inspections -presence of anti-contamination covers on pitot static tube	398
1506		Extreme icing conditions encounter	20	Lack of adherence to SOP in terms of de-icing / anti-icing procedures.	232
1507				Lack of adherence to SOP in terms of briefing and checklist before initiating of start of taxiing and take-off	399
1508				Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination	233
1509				Lack of adherence to emergency procedures - recovery from severe FCS failure	338
1510				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Pitot static system components	405
1511				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PFD	442



	ESD	Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.
1512				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ASI	439
1513				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Anti-icing system components	394
1514				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ADI	435
1515				Inadequate aircraft de-icing / anti-icing	180
1516				Flaws in pilot requirements definition process and/or training methodology	168
1517				Flaws in manufacturer quality control process - Pitot static system components	406
1518				Flaws in manufacturer quality control process - PFD	443
1519				Flaws in manufacturer quality control process - ASI	440
1520				Flaws in manufacturer quality control process - Anti-icing system components	395
1521				Flaws in manufacturer quality control process - ADI	436
1522				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
1523				Flaws in aircraft system maintenance process definition - Pitot static systems components	407
1524				Flaws in aircraft system maintenance process definition - PFD	444
1525				Flaws in aircraft system maintenance process definition - ASI	441
1526				Flaws in aircraft system maintenance process definition - Anti-icing systems components	396
1527				Flaws in aircraft system maintenance process definition - ADI	437
1528				Excessive bank angle	184
1529				Difference indications of independent aircraft speed / altitude or attitude indicators	267
1601	ESD17	Windshear encounter	21	Unintuitive and / or error prone system manual - On-board weather radar.	402
1602		Turbulence encounter	35	Traffic controller tiredness - Inadequate workload distribution	137
1603		System failure affecting aircraft configuration, controllability and/or flying qualities	25	Pilot tiredness - Inadequate workload distribution	167
1604		Frontal surface encounter	64	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
1605		Extreme turbulence encounter	19	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151



	ESD	Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.
1606		Convective weather encounter	18	Lack of adherence to SOP in terms of requested information support for other aircraft in terms of adverse weather conditions	234
1607				Lack of adherence to SOP in terms of providing flight crew with current weather report	237
1608				Lack of adherence to SOP in terms of application of findings from weather report	239
1609				Lack of adherence to SOP in terms of "fasten your seat belt" information activation in passenger cabin during flight in turbulence conditions	241
1610				Lack of adherence to SARPs in terms of avoiding adverse weather conditions during flight	235
1611				Lack of adherence to emergency procedures - control recovery	448
1612				Lack of adherence of passengers to the recommendation: Fasten seat belt while seated	240
1613				Incorrect weather report obtained by the flight crew	236
1614				Incorrect use of automation - On-board weather radar	403
1615				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - On-board weather radar	445
1616				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Integrity of primary aircraft structure.	341
1617				Inadequate airline / regulatory provider policy in terms of aware of the risks related to air travel	408
1618				Flaws in traffic controller requirements definition process and/or training methodology	145
1619				Flaws in pilot requirements definition process and/or training methodology	168
1620				Flaws in manufacturer quality control process - On-board weather radar	446
1621				Flaws in manufacturer quality control process - Integrity of primary aircraft structure.	348
1622				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
1623				Flaws in aircraft system maintenance process definition - On-board weather radar	447
1624				Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.	345



	ESD	Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.
1701	ESD18	Windshear encounter	21	Unintuitive and / or error prone system manual - Engine anti-icing system	206
1702		Wildlife incursion	5	Unintuitive and / or error prone system manual - ECAM	380
1703		Volcanic ash encounter	22	Taxiing without clearance	367
1704		Uncommanded thrust asymmetry	28	Pilot tiredness - Inadequate workload distribution	167
1705		Tire burst	80	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
1706		System failure affecting the operation of primary instruments / displays or standby instruments	26	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
1707		System failure affecting aircraft configuration, controllability and/or flying qualities	25	Lack of adherence to the SOP in terms of critical indicators cross-checking	224
1708		Severe failure of all engines on transoceanic route or over rarely populated area	41	Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ECAM.	242
1709		Severe engine failure	42	Lack of adherence to the current technology standards in terms of flight safety and efficiency - engines location.	434
1710		Low-on-fuel condition / fuel starvation	58	Lack of adherence to SOP in terms of de-icing / anti-icing procedures.	232
1711		Inadequate fuel quality / type	37	Lack of adherence to SOP in terms of awareness on supporting systems warning	244
1712		Fuel leak	2	Lack of adherence to SOP in terms of AFM limitations	227
1713		Failures resulting in a non-standard fuel distribution	27	Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401
1714		Extreme turbulence encounter	19	Lack of adherence to SARPs in terms of avoiding adverse weather conditions during flight	235
1715		Extreme icing conditions encounter	20	Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162
1716		Engine suffers severe surge	40	Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.	216
1717		Engine stops during start or approach / landing	3	Lack of adherence to emergency procedures - Fuel starvation	370
1718		Engine overheating	4	Lack of adherence to AFM limitations for Take- off	202
1719		Crew is incapable in result of extreme turbulence	38	Lack of adherence to AFM in terms of emergency procedures - engine restart procedure	429
1720		Convective weather encounter	18	Lack of adherence to AFM in terms of emergency procedures - engine failure	438
1721		Convective weather - heavy rain / hail resulted with engine compressor failure	36	Incorrect use of automation -Engine anti-ice system	181
1722		Contaminated Runway	39	Inadequate de-icing method applied	159



	ESD	Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.
1723		Bird strike	34	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Reduction gear in the engine	362
1724				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Oil distribution system	456
1725				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
1726				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Integrity of primary aircraft structure.	341
1727				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fuel system components	352
1728				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine turbine components	471
1729				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components	454
1730				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine sensors	462
1731				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine fuel distribution system	449
1732				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine combustor	460
1733				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine anti-ice systems and / or components	423
1734				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine accessory drive components.	191



	ESD	Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.
1735				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Electrical / wiring system components	467
1736				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ECAM (or similar) system components.	194
1737				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Compressor in the engine	186
1738				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.	288
1739				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components	464
1740				Inadequate aircraft de-icing / anti-icing	180
1741				Flaws in pilot requirements definition process and/or training methodology	168
1742				Flaws in manufacturer quality control process - Reduction gear in the engine.	363
1743				Flaws in manufacturer quality control process - Oil distribution system	457
1744				Flaws in manufacturer quality control process - Landing gear components.	376
1745				Flaws in manufacturer quality control process - Engine turbine components	472
1746				Flaws in manufacturer quality control process - Engine systems and / or components	458
1747				Flaws in manufacturer quality control process - Engine sensors	452
1748				Flaws in manufacturer quality control process - Engine fuel distribution system	450
1749				Flaws in manufacturer quality control process - Engine combustor	461
1750				Flaws in manufacturer quality control process - Engine anti-ice system and / or components	424
1751				Flaws in manufacturer quality control process - Engine accessory drive components.	189
1752				Flaws in manufacturer quality control process - Electrical / wiring systems components	468
1753				Flaws in manufacturer quality control process - ECAM (or similar) system components.	369
1754				Flaws in manufacturer quality control process - Compressor in the engine.	187
1755				Flaws in manufacturer quality control process - Components of Wing control surface system.	314



	ESD	Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.
1756				Flaws in manufacturer quality control process - APU systems and / or components	465
1757				Flaws in manufacturer quality control process - Integrity of primary aircraft structure.	348
1758				Flaws in manufacturer quality control process - Fuel system components.	372
1759				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
1760				Flaws in aircraft system maintenance process definition - Reduction gear in the engine.	364
1761				Flaws in aircraft system maintenance process definition - Oil distribution system	455
1762				Flaws in aircraft system maintenance process definition - Landing gear components.	377
1763				Flaws in aircraft system maintenance process definition - Fuel system components	361
1764				Flaws in aircraft system maintenance process definition - Engine turbine components	470
1765				Flaws in aircraft system maintenance process definition - Engine systems and / or components	463
1766				Flaws in aircraft system maintenance process definition - Engine sensors	453
1767				Flaws in aircraft system maintenance process definition - Engine fuel distribution system	451
1768				Flaws in aircraft system maintenance process definition - Engine combustor	459
1769				Flaws in aircraft system maintenance process definition - Engine anti-ice system and / or components	428
1770				Flaws in aircraft system maintenance process definition - Engine accessory drive components.	190
1771				Flaws in aircraft system maintenance process definition - Electrical wiring System	252
1772				Flaws in aircraft system maintenance process definition - ECAM (or similar) system components.	195
1773				Flaws in aircraft system maintenance process definition - Compressor in the engine.	188
1774				Flaws in aircraft system maintenance process definition - Components of Wing control surface system.	311
1775				Flaws in aircraft system maintenance process definition - APU systems and / or components	466
1776				Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.	345
1777				Error in calculation of necessary amount of fuel	243
1778				Aggressive maneuvering / overcontrolling	182



	ESD	Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.
1801	ESD19	Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129	Unstabilized final approach (high, fast, steep,)	416
1802		System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)	15	Unintuitive and / or error prone system manual - FMS	494
1803		System failure affecting the operation of primary instruments / displays or standby instruments	26	Pilot tiredness - Inadequate workload distribution	167
1804		Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown	49	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
1805		Missed approach execution necessary after prolonged flight due to e. g. extreme weather	44	Late thrust reduction or power-on touchdown	176
1806		Hard landing	47	Late deceleration and configuration set-up for approach and landing	414
1807		Gross loading error	16	Late activation of pedal braking or takeover from autobrake, when so required	174
1808		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
1809		Failures resulting in a non-standard fuel distribution	27	Lack of adherence to the main CRM rules	264
1810		Deep (long) landing	119	Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path	248
1811		Crew is incapable in result of shock related to hard landing	103	Lack of adherence to the current technology standards in terms of flight safety and efficiency - fuel tank allocation.	256
1812		Convective weather encounter	18	Lack of adherence to SOP in terms of pre-flight inspections - cargo securing quality	431
1813		Convective weather / turbulence / windshear or crosswind conditions during take-off	32	Lack of adherence to SOP in terms of necessary amount of fuel	254
1814		Continued unstabilized approach (failure to comply with go-around criteria and policy)	13	Lack of adherence to SOP in terms of load sheet preparation and verification	255
1815		Cargo loading unsecured / shift	17	Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing	246
1816		Bounced landing	118	Lack of adherence to SOP in terms of approach and landing	245
1817		AOA prevents missed approach	14	Lack of adherence to SOP in terms of AFM limitations in terms of weigh and balance	257
1818		Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate	45	Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather.	249
1819		Adverse weather / poor visibility conditions / darkness	6	Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.	295
1820				Lack of adherence to emergency procedures - control recovery	448



	ESD	Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.
1821				Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure	250
1822				Lack of adherence to AFM limitations for Take- off	202
1823				Lack of adherence to AFM limitations for landing	251
1824				Lack of adherence to AFM in terms of emergency procedures - stall recovery	292
1825				Incorrect use of automation - FMS	269
1826				Inappropriate selection of autobrake mode for given runway length and condition	178
1827				Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum	203
1828				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
1829				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine fuel distribution system	449
1830				High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,)	413
1831				Go-around attempt after thrust reversers deployment	193
1832				Flaws in pilot requirements definition process and/or training methodology	168
1833				Flaws in manufacturer quality control process - Landing gear components.	376
1834				Flaws in manufacturer quality control process - Engine fuel distribution system	450
1835				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
1836				Flaws in CRM training procedures	263
1837				Flaws in aircraft system maintenance process definition - Landing gear components.	377
1838				Flaws in aircraft system maintenance process definition - Engine fuel distribution system	451
1839				Failure to arm ground-spoilers	177
1840				Error in calculation of necessary amount of fuel	243
1841				DME / ILS DME confusion in assessing the final descent point / FAF	415
1842				Descent above desired descent profile	412
1843				Delayed selection of reverse thrust	175



	ESD	Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.
1844				Aggressive maneuvering / overcontrolling	182
1901	ESD21	System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)	15	Unstabilized final approach (high, fast, steep,)	416
1902		System failure affecting the operation of primary instruments / displays or standby instruments	26	Unintuitive and / or error prone system manual - FMS	494
1903		Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown	49	Pilot tiredness - Inadequate workload distribution	167
1904		Missed approach execution necessary after prolonged flight due to e. g. extreme weather	44	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
1905		Hard landing	47	Late thrust reduction or power-on touchdown	176
1906		Deep (long) landing	119	Late deceleration and configuration set-up for approach and landing	414
1907		Crew is incapable in result of shock related to hard landing	103	Late activation of pedal braking or takeover from autobrake, when so required	174
1908		Convective weather encounter	18	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
1909		Convective weather / turbulence / windshear or crosswind conditions during take-off	32	Lack of adherence to the main CRM rules	264
1910		Continued unstabilized approach (failure to comply with go-around criteria and policy)	13	Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path	248
1911		Bounced landing	118	Lack of adherence to SOP in terms of necessary amount of fuel	254
1912		AOA prevents missed approach	14	Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing	246
1913		Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate	45	Lack of adherence to SOP in terms of approach and landing	245
1914		Adverse weather / poor visibility conditions / darkness	6	Lack of adherence to SOP for approach and landing	247
1915				Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather.	249
1916				Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.	295
1917				Lack of adherence to emergency procedures - control recovery	448
1918				Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure	250
1919				Lack of adherence to AFM limitations for landing	251
1920				Incorrect use of automation - FMS	269
1921				Inappropriate selection of autobrake mode for given runway length and condition	178



	ESD	Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.
1922				Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum	203
1923				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
1924				High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,)	413
1925				Go-around attempt after thrust reversers deployment	193
1926				Flaws in pilot requirements definition process and/or training methodology	168
1927				Flaws in manufacturer quality control process - Landing gear components.	376
1928				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
1929				Flaws in CRM training procedures	263
1930				Flaws in aircraft system maintenance process definition - Landing gear components.	377
1931				Failure to arm ground-spoilers	177
1932				Error in calculation of necessary amount of fuel	243
1933				DME / ILS DME confusion in assessing the final descent point / FAF	415
1934				Descent above desired descent profile	412
1935				Delayed selection of reverse thrust	175
1936				Aggressive maneuvering / overcontrolling	182
2001	ESD23	Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly	116	Unstabilized final approach (high, fast, steep,)	416
2002		System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)	15	Traffic controller tiredness - Inadequate workload distribution	137
2003		System failure affecting the operation of primary instruments / displays or standby instruments	26	Tailwind component above limit	417
2004		Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown	49	Pilot tiredness - Inadequate workload distribution	167
2005		Hard landing	47	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
2006		Frontal surface encounter	64	Late thrust reduction or power-on touchdown	176
2007		Deep (long) landing	119	Late deceleration and configuration set-up for approach and landing	414



	ESD	Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.
2008		Convective weather encounter	18	Late activation of pedal braking or takeover from autobrake, when so required	174
2009		Convective weather / turbulence / windshear encounter conditions during landing	65	Lack of adherence to the main CRM rules	264
2010		Bounced landing	118	Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System.	215
2011		Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate	45	Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.	355
2012				Lack of adherence to SOP in terms of approach and landing	245
2013				Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared	214
2014				Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).	225
2015				Lack of adherence to emergency procedures - WEM	173
2016				Lack of adherence to emergency procedures - control recovery	448
2017				Lack of adherence to AFM limitations for landing	251
2018				Inappropriate selection of autobrake mode for given runway length and condition	178
2019				Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum	203
2020				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system	253
2021				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - LLWAS system	356
2022				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
2023				High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,)	413
2024				Flaws in traffic controller requirements definition process and/or training methodology	145
2025				Flaws in pilot requirements definition process and/or training methodology	168



	ESD	Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.
2026				Flaws in manufacturer quality control process - PWS system components	298
2027				Flaws in manufacturer quality control process - Landing gear components.	376
2028				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
2029				Flaws in CRM training procedures	263
2030				Flaws in aircraft system maintenance process definition - Landing gear components.	377
2031				Failure to arm ground-spoilers	177
2032				DME / ILS DME confusion in assessing the final descent point / FAF	415
2033				Descent above desired descent profile	412
2034				Delayed selection of reverse thrust	175
2101	ESD25	Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly	116	Unstabilized final approach (high, fast, steep,)	416
2102		Hard landing	47	Tailwind component above limit	417
2103		Convective weather encounter	18	Pilot tiredness - Inadequate workload distribution	167
2104		Convective weather / turbulence / windshear or crosswind conditions during take-off	32	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
2105		Continued unstabilized approach (failure to comply with go-around criteria and policy)	13	Long / floating flare	426
2106		Bounced landing	118	Late deceleration and configuration set-up for approach and landing	414
2107				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
2108				Lack of adherence to SOP in terms of approach and landing	245
2109				Lack of adherence to emergency procedures - control recovery	448
2110				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
2111				High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,)	413
2112				Flaws in pilot requirements definition process and/or training methodology	168
2113				Flaws in manufacturer quality control process - Landing gear components.	376
2114				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149



	ESD	Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.
2115				Flaws in aircraft system maintenance process definition - Landing gear components.	377
2116				Aggressive maneuvering / overcontrolling	182
2201	ESD26	Temporary loss of directional control during rollout	120	Use of nose wheel steering tiller during rollout	433
2202		Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly	116	Touchdown off centerline	427
2203		System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)	15	Pilot tiredness - Inadequate workload distribution	167
2204		Convective weather encounter	18	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
2205		Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate	45	Late thrust reduction or power-on touchdown	176
2206		Adverse weather / poor visibility conditions / darkness	6	Late deceleration and configuration set-up for approach and landing	414
2207				Late activation of pedal braking or takeover from autobrake, when so required	174
2208				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
2209				Lack of adherence to the main CRM rules	264
2210				Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing	246
2211				Lack of adherence to SOP in terms of approach and landing	245
2212				Lack of adherence to emergency procedures - control recovery	448
2213				Inappropriate use of differential reverse thrust	430
2214				Inappropriate selection of autobrake mode for given runway length and condition	178
2215				Inadequate use of differential braking	432
2216				Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum	203
2217				Inadequate crosswind landing / decrab technique	425
2218				High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,)	413
2219				Flaws in pilot requirements definition process and/or training methodology	168
2220				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149



	ESD	Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.
2221				Flaws in CRM training procedures	263
2222				Failure to remember / assess crosswind component limit for prevailing runway condition	418
2223				Failure to arm ground-spoilers	177
2224				Delayed selection of reverse thrust	175
2301	ESD27	Wildlife incursion	5	Pilot tiredness - Inadequate workload distribution	167
2302		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
2303		Tire burst	80	Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401
2304		System failure affecting the operation of primary instruments / displays or standby instruments	26	Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162
2305		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130	Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.	216
2306		Contaminated Runway	39	Lack of adherence to emergency procedures - control recovery	448
2307		Bird strike	34	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
2308				Flaws in pilot requirements definition process and/or training methodology	168
2309				Flaws in manufacturer quality control process - Landing gear components.	376
2310				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
2311				Flaws in aircraft system maintenance process definition - Landing gear components.	377
2701	ESD31	TCAS RA events (genuine or spurious)	70	Use of non-standard phraseology by pilot and/or controller	134
2702		System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System	78	Unintuitive and / or error prone system manual - communication equipment.	305
2703		System failure affecting the operation of primary instruments / displays or standby instruments	26	Traffic controller tiredness - Inadequate workload distribution	137
2704		Prolonged loss of communication (PLOC) between pilot and controller	73	Tactical or / and Planning Controller tiredness - Inadequate workload distribution	300
2705		Other cases of loss of separation	72	Pilot tiredness - Inadequate workload distribution	167
2706		Failures affecting TCAS operation	74	Navigation deviation	317
2707		Convective weather encounter in traffic intensive airport proximity	76	Military activity in controlled airport or located within controlled area	339
2708		Convective weather encounter	18	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150



	ESD	Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.
2709		Airspace infringement	71	Level bust (pilot lapse or late re-clearance by ATC)	313
2710		Adverse weather / poor visibility conditions / darkness	6	Late or inadequate response to ACAS warning	349
2711				Lack of or poor communication quality	146
2712				Lack of English proficiency	132
2713				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
2714				Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of STCA System.	344
2715				Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ACAS installed on aircraft.	347
2716				Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	148
2717				Lack of adherence to SOP for take-off procedure in terms of altimeter callibration.	294
2718				Lack of adherence to SOP for Airborne operation in terms of minimum seprataion	331
2719				Lack of adherence to Rules of the Air - adherence to Controller clearance	296
2720				Lack of adherence to regulations concerning independent ATCO monitoring	346
2721				Lack of adherence of airlines to time contraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data.	327
2722				Lack of adherence of airlines to declared Flight Plan.	329
2723				Intensified traffic related to general aviation activity e. g. over GA airport / airfield	342
2724				Incorrect use of communication equipment	336
2725				Incorrect or confusing / misleading ATC instructions	133
2726				Inappropriate visual avoidance maneuver	318
2727				Inadequate coordination between ATM centers and/or ATC sectors	321
2728				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - STCA System	351
2729				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492
2730				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MTCD System	328



ESD	Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.
2731			Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299
2732			Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.	271
2733			Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ADI system components	320
2734			Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ACAS system components	290
2735			Hearback ommitted	169
2736			General aviation activity in controlled airport or located within controlled area	340
2737			Flaws in traffic controller requirements definition process and/or training methodology	145
2738			Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology	301
2739			Flaws in pilot requirements definition process and/or training methodology	168
2740			Flaws in manufacturer quality control process - Onboard navigational systems and components.	493
2741			Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)	306
2742			Flaws in manufacturer quality control process - Fire extinguishing system components	482
2743			Flaws in manufacturer quality control process - Communication equipment systems and components.	272
2744			Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
2745			Flaws in conflict and separation minima infringement detection / elimination procedures	326
2746			Flaws in Airspace and Air Traffic planning procedures design process	323
2747			Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491
2748			Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)	410



	ESD	Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.
2749				Flaws in aircraft system maintenance process definition - Communication equipment systems and components.	270
2750				Failure to identify the pre-tactical conflict before it reach the tactical controller	330
2751				Failure to comply with an altitude or speed restriction / constraint	315
2752				Deviation from flight trajectory commanded by controller	343
2753				Altitude deviation	312
2754				Altimeter setting error	274
2801	ESD32	Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129	Use of non-standard phraseology by pilot and/or controller	134
2802		Taxiway confusion	7	Unintuitive and / or error prone system manual - ground radar.	164
2803		Runway confusion	1	Traffic controller tiredness - Inadequate workload distribution	137
2804		Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWY.	123	Takeoff without clearance	157
2805		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130	Pilot tiredness - Inadequate workload distribution	167
2806		Emergency landing	8	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
2807		Adverse weather / poor visibility conditions / darkness	6	Landing without clearance	158
2808				Lack of or poor communication quality	146
2809				Lack of English proficiency	132
2810				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
2811				Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of Runway Conflict Warning System.	172
2812				Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ground radar at the airport.	170
2813				Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	148
2814				Lack of adherence to SOP in terms of awareness on supporting systems (warning) - RIMCAS.	156
2815				Lack of adherence to SOP in terms of awareness on supporting systems (warning) - ground radar.	171
2816				Lack of adherence to SOP in terms of ATCO and approach or ground controller communication	163



Lack of awareness of own position on the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications. Lack of awareness of other traffic movements. Lack of awareness in terms of sufficient separation / clearence. Lack of awareness in terms of sufficient separation / clearence. Lack of awareness in terms of sufficient separation / clearence. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity. Lack of adherence to SOP for GND movements. Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings. Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings. Lack of adherence to ICAO Annex 14 and related documents in terms of nonrestricted view on airsite from TWR. Lack of adherence to ICAO Annex 14 and related documents in terms of inside lights distribution. Lack of adherence to emergency procedures. RWY collision avoidance. Lack of adherence to emergency procedures. RWY collision avoidance. Lack of adherence to emergency procedures. RWY collision avoidance. Lack of adherence to emergency procedures. RWY collision avoidance. Lack of adherence to emergency procedures. Lack of adherence to emergency procedures. RWY collision avoidance. Lack of adherence to emergency procedures. Lack of adherence to emergency procedures. Lack of adherence to emergency procedures. Lack of adherence to emergency procedures. Lack of adherence to emergency procedures. Lack of adherence to emergency procedures. Lack of adherence to emergency procedures. Lack of adherence to emergency procedures. Lack of adherence to ICAO Annex 14 and related to the service from the comment of the service from the service from the service from the service from the service from the service from the service from the serv		ESD	Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.
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RWY collision avoidance Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Incorrect or confusing / misleading ATC instructions Inadvertent deviation from cleared taxi route Inadequate management / separation of takeoffs and landings Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - RCWS Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground Radar Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground Radar Flaws in traffic controller requirements definition process and/or training methodology Flaws in pilot requirements definition process and/or training methodology Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Current airport diagram not reflecting critical changes	2824					147
procedures, inefficient management of hot spots Incorrect or confusing / misleading ATC instructions Inadvertent deviation from cleared taxi route 131 Inadequate management / separation of takeoffs and landings Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - RCWS Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground Radar Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground Radar Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground Radar Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground Radar Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground Radar Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground Radar Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - RCWS Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - RCWS Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - RCWS Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - RCWS Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance viting verification of the system	2825					135
Inadvertent deviation from cleared taxi route 131	2826				procedures, inefficient management of hot	139
Inadequate management / separation of takeoffs and landings 153	2827					133
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in methodology concerning verification of the system / product compliance with requirements - Ground Radar Hearback ommitted Flaws in traffic controller requirements definition process and/or training methodology Flaws in pilot requirements definition process and/or training methodology Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Current airport diagram not reflecting critical changes	2830				in methodology concerning verification of the system / product compliance with requirements	205
Flaws in traffic controller requirements definition process and/or training methodology Flaws in pilot requirements definition process and/or training methodology Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Current airport diagram not reflecting critical changes	2831				in methodology concerning verification of the system / product compliance with requirements	165
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and/or training methodology Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Current airport diagram not reflecting critical changes	2833				·	145
2835 Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology 2836 Current airport diagram not reflecting critical changes	2834				·	168
changes	2835				Flaws in maintenance technician / airworthiness specialist requirements definition process	149
2837 Callsign confusion 154	2836					155
	2837				Callsign confusion	154



	ESD	Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.
3001	ESD35	System failure affecting the operation of primary instruments / displays or standby instruments	26	Use of non-standard phraseology by pilot and/or controller	134
3002		Prolonged loss of communications (PLOC) between pilot and controller(s)	53	Unintuitive and / or error prone system manual - FMS	494
3003		Natural or artificial obstacle on runway course	60	Traffic controller tiredness - Inadequate workload distribution	137
3004		MSAW warning	51	Premature descent to DA(H) before G/S intercept or premature descent to MDA(H) before final-descent-point / FAF	281
3005		Inadequate NOTAM information concerning ground navigational aid failure	68	Premature descent below MDA(H) before reaching the visual-descent-point (VDP)	282
3006		Inadequate navigational chart	69	Pilot tiredness - Inadequate workload distribution	167
3007		Ground Navigational Aid failure	62	Not recognized ground Navaids System failure not reflected in NOTAM messages	308
3008		GPWS / TAWS alert / warning (genuine or spurious)	50	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
3009		Error in preparation of database for FMS	61	Late or inadequate response to MSAW warning	286
3010		Adverse weather / poor visibility conditions / darkness	6	Lack of or poor communication quality	146
3011				Lack of English proficiency	132
3012				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
3013				Lack of adherence to the SOP in terms of critical indicators cross-checking	224
3014				Lack of adherence to the main CRM rules	264
3015				Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of MSAW system.	302
3016				Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS	293
3017				Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. Navigational aid failure.	303
3018				Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. MSAW warning.	495
3019				Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	148
3020				Lack of adherence to SOP in terms of approach and landing	245
3021				Lack of adherence to SOP for AIR operations in terms of controller error in approach clearence instruction	307
3022				Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination	233



	ESD	Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.
3023				Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).	225
3024				Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.	295
3025				Incorrect use of automation - FMS	269
3026				Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain)	278
3027				Incorrect or confusing / misleading ATC instructions	133
3028				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492
3029				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MSAW System	411
3030				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS)	489
3031				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - GPWS system components	486
3032				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299
3033				Imbalanced and inaproppriate relation between cpt and his subordinates	304
3034				Flight below desired flight path during initial and/or final approach	283
3035				Flaws in traffic controller requirements definition process and/or training methodology	145
3036				Flaws in pilot requirements definition process and/or training methodology	168
3037				Flaws in manufacturer quality control process - Onboard navigational systems and components.	493
3038				Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS)	490



	ESD	Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.
3039				Flaws in manufacturer quality control process - GPWS system components	487
3040				Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)	306
3041				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
3042				Flaws in CRM training procedures	263
3043				Flaws in aircraft system maintenance process definition - stickshaker	136
3044				Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491
3045				Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS)	488
3046				Flaws in aircraft system maintenance process definition - GPWS system components	485
3047				Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)	410
3048				Failure to go-around, when so required	289
3049				Failure to follow published missed-approach procedure	291
3050				Failure to check navigation accuracy before approach	275
3051				Current airport diagram not reflecting critical changes	155
3052				Continued approach, when below DA(H) or MDA(H), after loss of visual references	284
3053				Altimeter setting error	274
3101	ESD36	Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129	Use of non-standard phraseology by pilot and/or controller	134
3102		Taxiway incursion	9	Traffic controller tiredness - Inadequate workload distribution	137
3103		Stand confusion	10	Pilot tiredness - Inadequate workload distribution	167



	ESD	Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.
3104		Lack of adherence to SOP for GND movements in terms of marshalling procedure	125	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
3105		Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication.	126	Lack of or poor communication quality	146
3106		Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	127	Lack of English proficiency	132
3107		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
3108		Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure)	124	Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	148
3109		Flaws in ground equipment maintenance process	128	Lack of adherence to SOP for GND movements. Poor execution of parking / docking /pushback procedure	138
3110		Adverse weather / poor visibility conditions / darkness	6	Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.	142
3111				Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications	140
3112				Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence	143
3113				Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity	144
3114				Lack of adherence to SOP for GND movements.	141
3115				Lack of adherence to emergency procedures - RWY collision avoidance	135
3116				Incorrect or confusing / misleading ATC instructions	133
3117				Inadvertent deviation from cleared taxi route	131
3118				Inadequate stall recovery procedure for the aircraft	152
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	ESD	Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.
3119				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake)	196
3120				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment	261
3121				Flaws in traffic controller requirements definition process and/or training methodology	145
3122				Flaws in pilot requirements definition process and/or training methodology	168
3123				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
3124				Current airport diagram not reflecting critical changes	155



Step 4 – Link between defences/controls updated list and CATS ESD number

ESD Occurrences (Uneventful Events) Deviations (Procedural/Flight Path)

	CATS	Occurrences (Uneventful Events)	Deviations (Procedural/Flight Path)		
	v0.1	DEFENSES/CONTROLS			
1	ESD1	Aircraft maintenance checks, fail-safe design	Voluntary reporting system, state authorities scrutiny		
2		Aircraft maintenance checks, fail-safe design	Voluntary reporting system, CAA monitoring		
3		Communication Systems maintenance and design,	State labor regulations, labor unions, ATM work organisation		
4		Avionics callibration, maintenance, design	Staff training, communication equipment reuirements, maintenance		
5		Undercarriage maintenance	Staff expertise, multistage process acceptance, process evaluation and update		
6		Engine maintenance, checks, design, pilot training	Staff expertise, multistage process acceptance, process evaluation and update		
7		runway state monitoring, airport safety program	Staff experience, safety culture, process evaluation and update		
8		Runway state monitoring, Airport safety program	Staff experience, reporting system, process evaluation and update		
9		Aircraft systems maintenance, checks, design	Staff experience, reporting system, process evaluation and update		
10			Requirements evaluation, multistage acceptance, voluntary reporting		
11			Pilot training, tower guidance		
12			Pilot training, tower guidance		
13			Pilot training, tower guidance		
14			Pilot training, system design, test, callibration		
15			Pilot training, software Q&A		
16			Multistage process acceptance, process update		
17			Multistage process acceptance, process update		
18			Multistage process acceptance, process update		
19			Multistage process acceptance, process update		
20			Multistage process acceptance, process update		
21			Multistage process acceptance, process update		
22			Multistage process acceptance, process update		
23			Multistage process acceptance, process update		
24			Multistage process acceptance, process update		
25			Multistage process acceptance, process update		
26			Multistage process acceptance, process update		



	ESD	Occurrences (Uneventful Events)	Deviations (Procedural/Flight Path)
27			Multistage process acceptance, process update
28			Multistage process acceptance, process update
29			Multistage process acceptance, process update
30			Multistage process acceptance, process update
31			Multistage process acceptance, process update
32			Multiple information sources, GPS, nav beacons, ATM cooperation, pilot training
33		+	
			Certification, tests, norms
34			Certification, Recipient test, reporting system
35			Certification, recipent tests, audits
36			Certification, recipent tests, audits
37			Certification, market pressure, regulations update, customer feedback
38			Certification, market pressure
39			Certification of product and menufacturer, market pressure,
			CAA monitoring, audits
40			Certification of product and menufacturer, market pressure,
			CAA monitoring, audits
41			Certification of product and menufacturer, market pressure,
			CAA monitoring, audits
42			Certification of product and manufacturer, market pressure, CAA monitoring, audits
43		_	Certification of product and manufacturer, market pressure,
43			CAA monitoring, audits
44			Certification of product and manufacturer, market pressure,
			CAA monitoring, audits
45			Certification of product and manufacturer, market pressure,
			CAA monitoring, audits
46			Certification of product and manufacturer, market pressure,
			CAA monitoring, audits
47			Certification of product and manufacturer, market pressure,
			CAA monitoring, audits
48			CAA monitoring, voluntary reporting
49			CAA monitoring, EU and state regulations, voluntary
			reporting
50			CAA monitoring, certification, staff experience
51			CAA monitoring, certification, staff experience
52			CAA monitoring, certification, staff experience
53			CAA monitoring, certification, staff experience
54			CAA monitoring, certification, staff experience



	ESD	Occurrences (Uneventful Events)	Deviations (Procedural/Flight Path)
55			CAA monitoring, certification, staff experience
56			CAA monitoring, certification, staff experience
57			CAA monitoring, certification, staff experience
58			CAA monitoring, certification, staff experience
59			CAA monitoring, certification, staff experience
60			CAA monitoring, certification, staff experience
61			Aircraft design, tests and certification
62			Air carrier organisation, state labour rgulations, labour
-			unions
101	ESD2	Airport security program, active observation and deterrence of wildlife	Voluntary reporting system, state authorities scrutiny
102		Aircraft maintenance checks, fail-safe design	Voluntary reporting system, CAA monitoring
103		Pilot training, airport safety program	State labor regulations, labor unions, ATM work organisation
104		Tower guidance, aircraft training, pilot traning	State labor regulations, labor unions, ATM work organisation
105		Aircraft maintenance, A, B, C, D-checks	Staff training, communication equipment reuirements,
106		Weather forecast, flight plan, navigation aids, Tower	Staff training
100		guidance	Starr training
107		runway state monitoring, airport safety program	Staff training
108		Runway state monitoring, Airport safety program	Staff training
109		Airport wildlife deterrence program	Staff training
110			Requirements evaluation, multistage acceptance, voluntary reporting
111			Requirements evaluation, multistage acceptance, voluntary
			reporting
112			Reporting system, procedure updates and evalutaion
113			Process evaluation, multistage acceptance, voluntary reporting
114			Piot training, aircraft tracking by ATC
115			Pilot traning, tower guidance, aircraft tracking
116			Pilot traning, tower guidance, aircraft tracking
117			Pilot traning, tower guidance, aircraft tracking
118			Pilot traning, tower guidance, aircraft tracking
119			Pilot training, tower guidance
120			Pilot training, tower guidance
121			Pilot training, system design, test, callibration
122			Pilot training, staff training and cooperation



ı	ESD	Occurrences (Uneventful Events)	Deviations (Procedural/Flight Path)
123			Pilot training, software Q&A
124			Pilot training, pilot legal responsibility
125			Pilot training, pilot legal responsibility
126			Pilot training, monitoring by ATC
127			Pilot training, legal responsibility, tower guidance
128			Pilot qulification tests, training programmes, certificates
129			Consultations on design stage, evaluation and update
130			Certification, market pressure
131			CAA monitoring, voluntary reporting
132			CAA monitoring, EU and state regulations, voluntary reporting
133			CAA monitoring
134			ATC training
135			Air staff and ATM staff training
136			Air carrier organisation, state labour rgulations, labour
			unions
201	ESD3	Aircraft maintenance checks, fail-safe design	Voluntary reporting system, state authorities scrutiny
202		Weather forecast, flight plan, navigation aids, Tower guidance	Voluntary reporting system, CAA monitoring
203		runway state monitoring, airport safety program	State labor regulations, labor unions, ATM work organisation
204		Runway state monitoring, Airport safety program	Staff training
205		Runway state monitoring, Airport safety program, weather forecast	Staff training
206			Requirements evaluation, multistage acceptance, voluntary reporting
207			Pilot training, tower guidance
208			Pilot training, tower guidance
209			Pilot training, tower guidance
210			Pilot training, system design, test, callibration
211			Pilot training, software Q&A
212	+		Pilot training, monitoring by ATC
213			Pilot training, computerised control aid, monitoring by ATC
214			Pilot training, aircraft control design
215			Certification, market pressure
216			CAA monitoring, voluntary reporting
217			CAA monitoring, EU and state regulations, voluntary reporting
218			ATC cooperation, pilot training
219	+		Air carrier organisation, state labour rgulations, labour
			unions
301	ESD4	Tire maintenance, replacement, runway state monitoring	Voluntary reporting system, state authorities scrutiny



	ESD	Occurrences (Uneventful Events)	Deviations (Procedural/Flight Path)
302		Aircraft maintenance checks, fail-safe design	Voluntary reporting system, CAA monitoring
303		runway state monitoring, airport safety program	State labor regulations, labor unions, ATM work organisation
304		Runway state monitoring, Airport safety program	Requirements evaluation, multistage acceptance, voluntary
			reporting
305			Pilot training, tower guidance
306			Pilot training, tower guidance
307			Pilot training, tower guidance
308			Pilot training, system design, test, callibration
309			Pilot training, software Q&A
310			Pilot training, computerised control aid, monitoring by ATC
311			Multistage process acceptance, process update
312			Multistage process acceptance, process update
313			Certification, market pressure
314			Certification, market pressure
315			Certification of product and menufacturer, market pressure,
			CAA monitoring, audits
316			CAA monitoring, voluntary reporting
317			CAA monitoring, EU and state regulations, voluntary
			reporting
318			CAA monitoring, certification, staff experience
319			Air carrier organisation, state labour rgulations, labour unions
401	ESD5	Aircraft maintenance checks, fail-safe design	Voluntary reporting system, state authorities scrutiny
402		Aircraft maintenance checks, fail-safe design	Voluntary reporting system, state authorities scrutiny
403		Flight plan, weather forecast, weather radar, ATM guidance	Voluntary monitoring, state regulations
404		Maintenance staff training, aircraft visual check prior to take-off	Voluntary monitoring, state regulations
405		Avionics maintenance, design	State labor regulations, labor unions, ATM work organisation
406		Runway state monitoring, Airport safety program, weather forecast	Staff training, tower guidance, cockpit design
407			Staff training, tower guidance
408			Staff training
409			Staff training
410			Staff training
411			Staff experience, reporting system, process evaluation and
→ 11			update
412			Requirements evaluation, multistage acceptance, voluntary reporting
413			Quality assurance (e.g. FMEA), reporting systems, process update



	ESD	Occurrences (Uneventful Events)	Deviations (Procedural/Flight Path)
414			Process evaluation, multistage acceptance, voluntary
			reporting
415			Pilot training, tower guidance
416			Pilot training, tower guidance
417			Pilot training, tower guidance
418			Pilot training, tower guidance
419			Pilot training, system design, test, callibration
420			Pilot training, publications of accident reports
421			Pilot training, fly-by-wire/light
422			Pilot training, automation
423			Pilot training, automation
424			Pilot training, aircraft control design
425			Pilot training
426			Pilot training
427			Multistage process acceptance, process update
428			Multistage process acceptance, process update
429			Multistage process acceptance, process update
430			Multistage process acceptance, process update
431			Multistage process acceptance, process update
432			Computerised checklist, external aircraft ground crew checks
433			Certification, tests, Quality assurance
434			Certification, tests, Quality assurance
435			Certification, tests, norms
436			Certification, Recipient test. Report system.
437			Certification, market pressure
438			CAA monitoring, voluntary reporting
439			CAA monitoring, EU and state regulations, voluntary reporting
440			Aircraft design, tests and certification
441			Air carrier organisation, state labour rgulations, labour unions
501	ESD6	Work organisation, state labor regulations, unions, labor audits/inspections	Voluntary reporting system, state authorities scrutiny
502		Aircraft maintenance checks, fail-safe design	State labor regulations, labor unions, ATM work organisation
503		Maintenance staff training	Staff training, tower guidance
504		Manuals, state regulations, audits	Staff training, safety culture, pre-flight checks
505		Flight plan, weather forecast, weather radar, ATM guidance	Staff training
506		Weather forecast, flight plan, navigation aids, Tower guidance	Staff training



	ESD	Occurrences (Uneventful Events)	Deviations (Procedural/Flight Path)
507		Flight plan, weather forecast, weather radar, ATM guidance	Requirements evaluation, multistage acceptance, voluntary reporting
508		Maintenance staff training, aircraft visual check prior to take-off	Process evaluation, multistage acceptance, voluntary reporting
509		Pilot training, weather forecast, flight plan, ATM guidance, navigation aids	Pilot training, aircraft control design
510			Pilot training
511			Pilot and maintenance training, staff cooperation
512			Multistage process acceptance, process update
513			Multistage process acceptance, process update
514			Certification, tests, Quality assurance
515			Certification, Recipient test. Report system.
516			Certification, recipent tests
517			Aircraft design, tests and certification
518			Air carrier organisation, state labour rgulations, labour
			unions
701	ESD8	Aircraft maintenance checks, fail-safe design	Voluntary reporting system, state authorities scrutiny
702		wather forecast, pilot training, ATM guidance	Tower staff training
703		Flight plan, weather forecast, weather radar, ATM guidance	State labor regulations, labor unions, ATM work organisation
704		Weather forecast, flight plan, navigation aids, Tower guidance	State labor regulations, labor unions, ATM work organisation
705			Staff training
706			Requirements evaluation, multistage acceptance, voluntary reporting
707			Requirements evaluation, multistage acceptance, voluntary reporting
708			Pilot training, instruments information aid
709			Multistage process acceptance, process update
710			Multistage process acceptance, process update
711			International and state regulations, norms, audits, certification and their updates
712			Certification, market pressure, regulations update, CAA monitoring
713			Certification of profuct and manufacturer, recipent test, reporting systems
714	+		CAA monitoring, state regulations
715			Air carrier organisation, state labour rgulations, labour unions
801	ESD9	Airport security program, active observation and deterrence of wildlife	Voluntary reporting system, state authorities scrutiny
802		Tire maintenance, replacement, runway state monitoring	Voluntary reporting system, CAA monitoring
803		Aircraft maintenance checks, fail-safe design	State labor regulations, labor unions, ATM work organisation



	ESD	Occurrences (Uneventful Events)	Deviations (Procedural/Flight Path)
804		runway state monitoring, airport safety program	Requirements evaluation, multistage acceptance, voluntary reporting
805		Runway state monitoring, Airport safety program	Pilot training, tower guidance
806		Airport wildlife deterrence program	Pilot training, tower guidance
807			Pilot training, tower guidance
808			Pilot training, system design, test, callibration
809			Pilot training, software Q&A
810			Pilot training, computerised control aid, monitoring by ATC
811			Pilot training
812			Multistage process acceptance, process update
813			Multistage process acceptance, process update
814			Certification, market pressure
815			Certification of product and menufacturer, market pressure, CAA monitoring, audits
816			Certification of product and manufacturer, market pressure,
			CAA monitoring, audits
817			CAA monitoring, voluntary reporting
818			CAA monitoring, EU and state regulations, voluntary reporting
819			CAA monitoring, certification, staff experience
820			CAA monitoring, certification, staff experience
821			CAA monitoring
822			Air carrier organisation, state labour rgulations, labour unions
901	ESD10	Airport security program, active observation and deterrence of wildlife	Voluntary reporting system, state authorities scrutiny
902		Tire maintenance, replacement, runway state monitoring	Voluntary reporting system, CAA monitoring
903		Aircraft maintenance checks, fail-safe design	State labor regulations, labor unions, ATM work organisation
904		Aircraft maintenance checks, fail-safe design	Staff training, tower guidance, cockpit design
905		runway state monitoring, airport safety program	Staff training, ATC coopertation
906		Runway state monitoring, Airport safety program	Staff training
907		Airport wildlife deterrence program	Staff training
908			Requirements evaluation, multistage acceptance, voluntary reporting
909	+		Pilot training, tower guidance
910	+		Pilot training, tower guidance
911			Pilot training, tower guidance Pilot training, tower guidance
911			Pilot training, tower guidance Pilot training, tower guidance
913			Pilot training, system design, test, callibration



	ESD	Occurrences (Uneventful Events)	Deviations (Procedural/Flight Path)
914			Pilot training, software Q&A
915			Pilot training, computerised control aid, monitoring by ATC
916			Pilot training
917			Multistage process acceptance, process update
918			Multistage process acceptance, process update
919			Certification, market pressure
920			Certification of product and menufacturer, market pressure, CAA monitoring, audits
921			Certification of product and menufacturer, market pressure, CAA monitoring, audits
922			
922			CAA monitoring, voluntary reporting
923			CAA monitoring, EU and state regulations, voluntary reporting
924			CAA monitoring, certification, staff experience
925			CAA monitoring, certification, staff experience
926			CAA monitoring
927			Air carrier organisation, state labour rgulations, labour unions
1001	ESD11	Airport security program, active observation and deterrence of wildlife	Voluntary reporting system, state authorities scrutiny
1002		Volcano activity observation, Flight plan, ATM guidance	Voluntary reporting system, CAA monitoring
1003		Work organisation, state labor regulations, unions, labor audits/inspections	State labor regulations, labor unions, ATM work organisation
1004		ATM guidance, radar, pilot training, procedures, transponder	Staff training, certification, audits
1005		Aircraft maintenance checks, aircarft design, security, maintenance staff training,	Staff training
1006		Manuals, state regulations, audits	Staff training
1007		Runway state monitoring, Airport safety program	Staff expertise, multistage process acceptance, process evaluation and update
1008		Runway state monitoring, TCAS, pilot training	Requirements evaluation, multistage acceptance, voluntary reporting
1009		Ground crew training, checklists, procedures	Quality assurance (e.g. FMEA), reporting systems, process update
1010			Pilot training, certified computerised enginge management
1011			Multistage process acceptance, process update
1012			Multistage process acceptance, process update
1013			Multistage process acceptance, process update
1014			Multistage process acceptance, process update
1015			Multistage process acceptance, process update



	ESD	Occurrences (Uneventful Events)	Deviations (Procedural/Flight Path)
1016			Multistage process acceptance, process update
1017			Multistage process acceptance, process update
1018			Multistage process acceptance, process update
1019			Multistage process acceptance, process update
1020			Maintenance staff training, audits
1021			International and state regulations, norms, audits,
			certification and their updates
1022			Certification, tests, Quality assurance
1023			Certification, regulations update
			· • ·
1024			Certification, market pressure, regulations update, customer
4025			feedback
1025			Certification of product and manufacturer, market pressure,
			CAA monitoring, audits
1026			Certification of product and manufacturer, market pressure,
			CAA monitoring, audits
1027			Certification of product and manufacturer, market pressure,
			CAA monitoring, audits
1028			Certification of product and manufacturer, market pressure,
			CAA monitoring, audits
1029			Certification of product and manufacturer, market pressure,
			CAA monitoring, audits
1030			Certification of product and manufacturer, market pressure,
			CAA monitoring, audits
1031			CAA monitoring, certification, staff experience
1032			CAA monitoring, certification, staff experience
1033			CAA monitoring, certification, staff experience
1034			CAA monitoring, certification, staff experience
1035			CAA monitoring, certification, staff experience
4026			A. 6
1036			Aircraft certification, proper design, maintenance checks, maintenance certification
1037			Air carrier organisation, state labour rgulations, labour
			unions
1101	ESD12	Aircraft maintenance checks, fail-safe design	Voluntary reporting system, state authorities scrutiny
1102		Pilot training incl. IFR flights, ATM guidance, navigation aids, pilot training	State labor regulations, labor unions, ATM work organisation
1103			Staff training
1104			Staff training
1105			Staff training
1106			Staff expertise, multistage process acceptance, process evaluation and update



	ESD	Occurrences (Uneventful Events)	Deviations (Procedural/Flight Path)
1107			Requirements evaluation, multistage acceptance, voluntary
			reporting
1108			Pilot training, tower/ATM training
1109			Pilot training, fool-proof design
1110			Pilot training, fly-by-wire
1111			Pilot training, fly-by-wire
1112			Pilot training, control design, fly-by-wire/light
1113			Pilot training, control design, fly-by-wire/light
1114			Pilot training, control design, fly-by-wire/light
1115			Pilot training
1116			Multistage process acceptance, process update
1117			Multistage process acceptance, process update
1118			Certification, recipent tests, audits
1119			Certification, market pressure, regulations update, customer feedback
1120			Callibration, mainenance, pre-flight check.
1121			CAA monitoring, state regulations
1122			Air carrier organisation, state labour rgulations, labour unions
1201	ESD13	Aircraft maintenance checks, aircarft design	Voluntary reporting system, state authorities scrutiny
1202		Aircraft maintenance checks, fail-safe design	State labor regulations, labor unions, ATM work organisation
1203		Aircraft maintenance checks, fail-safe design	Staff training
1204			Staff training
1205			Staff expertise, multistage process acceptance, process evaluation and update
1206			Staff expertise, multistage process acceptance, process
			evaluation and update
1207			Staff experience, safety culture, process evaluation and update
1208			Staff experience, reporting system, process evaluation and update
1209			Staff experience, reporting system, copmponent evaluation and check
1210			Requirements evaluation, multistage acceptance, voluntary
1211			reporting Pre-flight checks, Staff experience, reporting system, process evaluation and update
1212			Pre-flight checks, Staff experience, reporting system, process evaluation and update
1213			Pilot training, equipment design, manual
1214			Pilot training, control design, fly-by-wire/light
1215			Multistage process acceptance, process update



	ESD	Occurrences (Uneventful Events)	Deviations (Procedural/Flight Path)
1216			Multistage process acceptance, process update
1217			Multistage process acceptance, process update
1218			Multistage process acceptance, process update
1219			Multistage process acceptance, process update
1220			Multistage process acceptance, process update
1221			Certification, Recipient test, reporting system
1222			Certification, recipent tests, audits
1223			Certification, recipent tests, audits
1224			Certification, recipent test, audits
1225			CAA monitoring, certification, staff experience
1226			Air carrier organisation, state labour rgulations, labour unions
1301	ESD14	Work organisation, state labor regulations, unions, labor audits/inspections	Voluntary reporting system, state authorities scrutiny
1302		Aircraft maintenance checks, fail-safe design	State labor regulations, labor unions, ATM work organisation
1303		Aircraft maintenance checks, fail-safe design	State labor regulations, labor unions, ATM work organisation
1304		Aircraft maintenance checks, aircarft design, security, maintenance staff training,	Staff training, fool-proof design
1305		Manuals, state regulations, audits	Staff training
1306		Flight plan, weather forecast, weather radar, ATM guidance	Staff training
1307		Pilot health monitoring	Requirements evaluation, multistage acceptance, voluntary reporting
1308		Aircraft maintenance checks, fail-safe design	Requirements evaluation, multistage acceptance, voluntary reporting
1309		Airport wildlife deterrence program	Pilot traning, tower guidance, aircraft tracking
1310		Pilot training incl. IFR flights, ATM guidance, navigation aids, pilot training	Pilot training, monitoring by ATC
1311		, topp the d	Pilot qulification tests, training programmes, certificates
1312			Multistage process acceptance, process update
1313			Multistage process acceptance, process update
1314			Multistage process acceptance, process update
1315			Maintenance certification, audits, CAA monitoring
1316			Certification, market pressure, regulations update, customer feedback
1317			Certification of product and menufacturer, market pressure, CAA monitoring, audits



	ESD	Occurrences (Uneventful Events)	Deviations (Procedural/Flight Path)
1318			Certification of product and manufacturer, market pressure, CAA monitoring, audits
1319			CAA monitoring, certification, staff experience
1320			CAA monitoring, certification, staff experience
1321			CAA monitoring, certification, staff experience
1322			CAA monitoring
1323			ATC training
1324			Air staff and ATM staff training
1325			Air carrier organisation, state labour rgulations, labour unions
1401	ESD15	Flight plan, weather forecast, weather radar, ATM guidance	Voluntary reporting system, state authorities scrutiny
1402		Aircraft maintenance checks, fail-safe design	State labor regulations, labor unions, ATM work organisation
1403		Aircraft maintenance checks, fail-safe design	Staff training
1404			Staff training
1405			Requirements evaluation, multistage acceptance, voluntary reporting
1406			Pilot training, control design, fly-by-wire/light
1407			Pilot training, automation
1408			Pilot training, automation
1409			Pilot training
1410			Multistage process acceptance, process update
1411			Certification of product and menufacturer, market pressure, CAA monitoring, audits
1412			CAA monitoring, certification, staff experience
1413			Aircraft design, tests and certification
1414			Air carrier organisation, state labour rgulations, labour unions
1501	ESD16	Work organisation, state labor regulations, unions, labor audits/inspections	Voluntary reporting system, state authorities scrutiny
1502		Volcano activity observation, Flight plan, ATM guidance	State labor regulations, labor unions, ATM work organisation
1503		Manuals, state regulations, audits	Staff training, audits, CAA monitoring, state norms and regulations
1504		Flight plan, weather forecast, weather radar, ATM guidance	Staff training
1505		Aircraft maintenance checks, fail-safe design	Staff training
1506		Aircraft maintenance checks, fail-safe design	Requirements evaluation, multistage acceptance, voluntary reporting
1507			Pilot training, equipment design, manual
1508			Pilot training, control design, fly-by-wire/light
1509			Pilot training, automation
1510			Callibration, mainenance, pre-flight check.



	ESD	Occurrences (Uneventful Events)	Deviations (Procedural/Flight Path)
1511			Aircraft design, tests and certification
1512			Air carrier organisation, state labour rgulations, labour unions
1601	ESD17	wather forecast, pilot training, ATM guidance	Weather forecast organisational quality assurance, forecast requirements, reliable source of forecasts
1602		Pilot training, wather forecast, flight plan, ATM guidance, navigation aids	Voluntary reporting system, state authorities scrutiny
1603		Flight plan, weather forecast, weather radar, ATM guidance	Stward(ess) checks, request. Legal responsibility
1604		Flight plan, weather forecast, weather radar, ATM guidance	State labor regulations, labor unions, ATM work organisation
1605		Flight plan, weather forecast, weather radar, ATM guidance	State labor regulations, labor unions, ATM work organisation
1606		Aircraft maintenance checks, fail-safe design	Staff training, reporting, norms, CAA monitoring
1607			Staff training, reporting
1608			Staff training, reporting
1609			Staff training
1610			Staff training
1611			Staff training
1612			Staff training
1613			Requirements evaluation, multistage acceptance, voluntary reporting
1614			Requirements evaluation, multistage acceptance, voluntary reporting
1615			Multistage process acceptance, process update
1616			Certification of product and menufacturer, market pressure, CAA monitoring, audits
1617			CAA monitoring, certification, staff experience
1618			Air carrier organisation, state labour rgulations, labour unions
1701	ESD18	Volcano activity observation, Flight plan, ATM guidance	Voluntary reporting system, state authorities scrutiny
1702		Tire maintenance, replacement, runway state monitoring	Voluntary reporting system, CAA monitoring
1703		Seat belts, pilot physical and health tests,	State labor regulations, labor unions, ATM work organisation
1704		Seat belts, crew physical and health tests,	Staff training, reporting, norms, CAA monitoring
1705		Runway state monitoring, Airport safety program	Staff training
1706		Pilot training, weather forecast, flight plan, ATM guidance, navigation aids	Staff training
1707		Pilot training, flight planning, communication with ATM	Staff training
1708		Pilot training, engine control system, engine design, engine maintenance	Staff experience, safety culture, process evaluation and update
1709		Pilot training, engine control system, engine design, engine maintenance	Software quality assurance, tests, user training



	ESD	Occurrences (Uneventful Events)	Deviations (Procedural/Flight Path)
1710		Flight plan, weather forecast, weather radar, ATM guidance	Requirements evaluation, multistage acceptance, voluntary reporting
1711		Flight plan, weather forecast, weather radar, ATM guidance	Quality assurance (e.g. FMEA), reporting systems, process update
1712		Flight plan, weather forecast, weather radar, ATM guidance	Piot training, aircraft tracking by ATC
1713		Flight plan, weather forecast, weather radar, ATM guidance	Pilot training, tower cooperation
1714		Daily fuel quality checks at FBO, tank markings, ground crew training	Pilot training, publications of accident reports
1715		Airstrip markings, ATM guidance, ILS operation	Pilot training, monitoring by ATC
1716		Airport wildlife deterrence program	Pilot training, legal responsibility, tower guidance
1717		Airport security program, active observation and deterrence of wildlife	Pilot training, fly-by-wire/light, ILS, tower guidance
1718		Airport security	Pilot training, fly-by-wire/light
1719		Airport beacon, ATM guidance, Airport tower, navigation aids, GPS, TACAN	Pilot training, fly-by-wire/light
1720		Aircraft maintenance checks, fail-safe design	Pilot training, fly-by-wire/light
1721		Aircraft maintenance checks, fail-safe design	Pilot training, fly-by-wire/light
1722		Aircraft maintenance checks, aircarft design	Pilot training, fly-by-wire
1723		Aircraft maintenance checks, aircarft design	Pilot training, flight plan acceptance
1724			Pilot training, control design, fly-by-wire/light, automatic slats
1725			Pilot training, control design, fly-by-wire/light
1726			Pilot training, control design
1727			Pilot training, automation
1728			Pilot training, ATC monitoring and cooperation
1729			Pilot training, ATC cooperation
1730			Pilot training, aircraft tracking by tower staff
1731			Pilot training, aircraft control design
1732			Pilot training
1733			Pilot training
1734			Pilot training
1735			Pilot training
1736			Pilot training
1737			Pilot training
1738			Pilot training
1739			Pilot training
1740			Multistage process acceptance, process update
1741			Multistage process acceptance, process update
1742			Multistage process acceptance, process update
1743			Multistage process acceptance, process update



1748 Certification, regulations update 1749 Certification, regulations update 1750 Certification, recipent tests, audits 1750 Certification of product and menufacturer, marke 1751 Certification of product and menufacturer, marke 1751 Certification of product and menufacturer, marke 1752 Certification of product and manufacturer, marke 1753 Certification of product and manufacturer, marke 1754 Certification of product and manufacturer, marke 1755 Certification of product and manufacturer, marke 1756 Certification of product and manufacturer, marke 1757 CAA monitoring, audits 1756 CAA monitoring, audits 1757 CAA monitoring, certification, staff experience 1758 CAA monitoring, certification, staff experience 1759 CAA monitoring, certification, staff experience 1759 CAA monitoring, certification, staff experience 1760 CAA monitoring, certification, staff experience 1760 CAA monitoring, certification, staff experience 1761 Aircraft design, tests and certification 1762 Aircraft design, tests and certification 1763 Aircraft design, tests and certification 1764 Aircraft design, tests and certification 1765 Aircraft design, tests and certification 1760 CAA monitoring 1761 Aircraft design, tests and certification 1762 Aircraft design, tests and certification 1763 Aircraft design, tests and certification 1764 Aircraft design, tests and certification 1765 Aircraft design, tests and certification 1766 Aircraft design, tests and certification 1767 Aircraft design, tests and certification 1768 Aircraft design, tests and certification 1769 Aircraft design, tests and certification 1760 Aircraft design, tests and certification 1760 Aircraft design, tests and certification 1761 Aircraft design, tests and certification 1762 Aircraft design, tests and certification 1763 Aircraft design, tests and certification 1764 Aircraft design, tests and certification 1765 Aircraft design, tests and certification 1766 Aircraft design, tests and certification 1767 Aircraft design, tests and certification 1768 Aircraft design, tests and certifica	ı	ESD	Occurrences (Uneventful Events)	Deviations (Procedural/Flight Path)
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1747 International and state regulations, norms, audit certification and their updates 1748 Certification, regulations update 1749 Certification, regulations update 1750 Certification of product and menufacturer, marks 1751 Certification of product and menufacturer, marks 1751 Certification of product and menufacturer, marks 1752 Certification of product and manufacturer, marks 1753 Certification of product and manufacturer, marks 1754 Certification of product and manufacturer, marks 1755 Certification of product and manufacturer, marks 1756 Certification of product and manufacturer, marks 1757 CaA monitoring, audits 1758 Certification of product and manufacturer, marks 1759 CAA monitoring, cuttification, staff experience 1759 CAA monitoring, certification, staff experience 1759 CAA monitoring, certification, staff experience 1750 CAA monitoring, certification, staff experience 1750 CAA monitoring, certification, staff experience 1750 CAA monitoring, certification, staff experience 1750 CAA monitoring, certification, staff experience 1750 CAA monitoring 1761 CAA monitoring 1761 CAA monitoring 1762 CAA monitoring 1762 CAA monitoring 1763 CAA monitoring 1764 CAA monitoring 1765 CAA monitoring 1766 CAA monitoring 1766 CAA monitoring 1767 CAA monitoring 1768 CAA monitoring 1769 CAA monitoring 1760 CAA monitoring 1760 CAA monitoring, certification 1760 CAA monitoring 1761 CAA monitoring 1762 CAA monitoring 1764 CAA monitoring 1765 CAA monitoring 1766 CAA monitoring 1767 CAA monitoring 1767 CAA monitoring 1768 CAA monitoring 1769 CAA monitoring 1760 CAA monitoring 1	1745			Multistage process acceptance, process update
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Certification, regulations update	1747			International and state regulations, norms, audits,
1759 Certification, recipent tests, audits 1750 Certification of product and menufacturer, marks 1751 Certification of product and menufacturer, marks 1752 Certification of product and menufacturer, marks 1753 Certification of product and manufacturer, marks 1754 Certification of product and manufacturer, marks 1754 Certification of product and manufacturer, marks 1755 Certification of product and manufacturer, marks 1756 CAA monitoring, audits 1756 CAA monitoring, EU and state regulations, volunt 1757 CAA monitoring, certification, staff experience 1758 CAA monitoring, certification, staff experience 1759 CAA monitoring, certification, staff experience 1750 CAA monitoring, certification, staff experience 1750 CAA monitoring, certification, staff experience 1750 CAA monitoring, certification, staff experience 1750 CAA monitoring, certification, staff experience 1750 CAA monitoring, certification, staff experience 1750 CAA monitoring, certification, staff experience 1750 CAA monitoring, certification, staff experience 1750 CAA monitoring, certification, staff experience 1750 CAA monitoring, certification, staff experience 1750 CAA monitoring, certification, staff experience 1750 CAA monitoring, certification 1761 Air carrier organisation, state labour regulations, lunions 1762 CAA monitoring 1761 CAA monitoring 1761 CAA monitoring 1762 CAA monitoring 1763 Air carrier organisation, state labour regulations, lunions 1764 CAA monitoring 1765 CAA monitoring 1766 CAA monitoring 1766 CAA monitoring 1767 CAA monitoring 1768 Air carrier organisation, staff experience 1768 CAA monitoring 1769 CAA monitoring 1760 CAA monitoring 1	1748			
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CAA monitoring, certification, staff experience CAA monitoring, certification, staff experience CAA monitoring, certification, staff experience CAA monitoring, certification, staff experience CAA monitoring CAA monitoring Aircraft design, tests and certification Air carrier organisation, state labour rgulations, lunions BSD19 Work organisation, state labor regulations, unions, labor audits/inspections Weather forecast, flight plan, navigation aids, Tower guidance Weather forecast, flight plan, navigation aids, Tower guidance Staff training, certification Staff training, certification Runway state monitoring, Airport safety program, weather forecast Pilot training, aircraft tracking by airport tower Staff training, certification Staff training, certification Staff training, certification Staff training, certification Staff training, certification Staff training, certification Staff training, certification Staff training, certification Staff training, certification Staff training, certification Staff training, certification Staff training, certification Staff training, certification Staff training, certification				reporting
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1760 CAA monitoring 1761 Aircraft design, tests and certification 1762 Air carrier organisation, state labour rgulations, labor audits/inspections 1801 Weather forecast, flight plan, navigation aids, Tower guidance 1803 Staff training, certification 1804 Runway state monitoring, Airport safety program, weather forecast 1805 Pilot training, aircraft tracking by airport tower 1806 Pilot training, weather forecast, flight plan, ATM guidance, navigation aids 1807 Pilot training, ILS, Tower guidance, glideslope Staff training 1806 Staff training 1807 Staff training 1807 Staff training 1808 Staff training 1809 Staff training 1809 Staff training 1809 Staff training 1809 Staff training 1809 Staff training 1809 Staff training 1809 Staff training 1809 Staff training 1809 Staff training 1809 Staff training	1758			CAA monitoring, certification, staff experience
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Air carrier organisation, state labour rgulations, labor audits/inspections Weather forecast, flight plan, navigation aids, Tower guidance Runway state monitoring, Airport safety program, weather forecast Pilot training, aircraft tracking by airport tower Pilot training, weather forecast, flight plan, ATM guidance, navigation aids Pilot training, ILS, Tower guidance, glideslope Air carrier organisation, state labour rgulations, labor unions Voluntary reporting system, state authorities scriptions State labor regulations, labor unions, ATM work organisation Staff training, certification Staff training, certification Staff training, certification Staff training Staff training	1760			CAA monitoring
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1801 ESD19 Work organisation, state labor regulations, unions, labor audits/inspections 1802 Weather forecast, flight plan, navigation aids, Tower guidance 1803 Staff training, certification 1804 Runway state monitoring, Airport safety program, weather forecast 1805 Pilot training, aircraft tracking by airport tower 1806 Pilot training, weather forecast, flight plan, ATM guidance, navigation aids 1807 Pilot training, ILS, Tower guidance, glideslope Staff training Voluntary reporting system, state authorities scriptions. Stafe labor regulations, labor unions, ATM work of guidance, stafe training, certification Staff training, certification Staff training Staff training Staff training	1762			Air carrier organisation, state labour rgulations, labour
Weather forecast, flight plan, navigation aids, Tower guidance State labor regulations, labor unions, ATM work of guidance Staff training, certification Runway state monitoring, Airport safety program, weather forecast Pilot training, aircraft tracking by airport tower Staff training, certification Staff training, certification Staff training, certification Staff training, certification Staff training, certification Staff training, certification Staff training, certification Staff training, certification Staff training, certification Staff training, certification Staff training, certification Staff training, certification Staff training, certification Staff training, certification	1801 E	ESD19		Voluntary reporting system, state authorities scrutiny
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1804 Runway state monitoring, Airport safety program, weather forecast 1805 Pilot training, aircraft tracking by airport tower 1806 Pilot training, weather forecast, flight plan, ATM guidance, navigation aids 1807 Pilot training, ILS, Tower guidance, glideslope Staff training Staff training Staff training Staff training			guidance	
weather forecast Pilot training, aircraft tracking by airport tower Staff training, certification Staff training, certification Pilot training, weather forecast, flight plan, ATM guidance, navigation aids Pilot training, ILS, Tower guidance, glideslope Staff training	1803			Staff training, certification
Pilot training, aircraft tracking by airport tower Staff training, certification Pilot training, weather forecast, flight plan, ATM guidance, navigation aids Pilot training, ILS, Tower guidance, glideslope Staff training	1804			Staff training, certification
guidance, navigation aids 1807 Pilot training, ILS, Tower guidance, glideslope Staff training	1805			Staff training, certification
1807 Pilot training, ILS, Tower guidance, glideslope Staff training	1806			Staff training
1808 Pilot training, ILS, Tower guidance, fail-safe design Staff training	1807			Staff training
	1808		Pilot training, ILS, Tower guidance, fail-safe design	Staff training
1809 Pilot training, ILS, Tower guidance Software quality assurance, tests, user training	1809		Pilot training, ILS, Tower guidance	Software quality assurance, tests, user training



	ESD	Occurrences (Uneventful Events)	Deviations (Procedural/Flight Path)
1810		Pilot training, aircraft design	Requirements evaluation, multistage acceptance, voluntary reporting
1811		Pilot training incl. IFR flights, ATM guidance, navigation aids, pilot training	Reporting system, procedure updates and evalutaion
1812		Pilot training	Pilot training, responsibility, tower guidance to limited extent
1813		Manuals, state regulations, audits	Pilot training, responsibility, tower guidance
1814		Ground crew training, pilot inspection	Pilot training, qualification certification, cockpit design
1815		Ground crew training, checklists, procedures	Pilot training, multiple information source
1816		Flight plan, weather forecast, weather radar, ATM guidance	Pilot training, instrument panel aids
1817		Aircraft maintenance checks, fail-safe design	Pilot training, ILS, instrument panel aids
1818		Aircraft maintenance checks, aircarft design	Pilot training, fool-proof design
1819		Aircraft maintenance checks	Pilot training, fly-by-wire, information in cockpit for pilot
1820		Seat design, pilot physical tests	Pilot training, control design, fly-by-wire/light
1821			Pilot training, control design
1822			Pilot training, control design
1823			Pilot training, control design
1824			Pilot training, control design
1825			Pilot training, ATC cooperation
1826			Pilot training, aircraft control design
1827			Pilot training, aircraft control design
1828			Pilot training and experience
1829			Pilot training
1830			Pilot training
1831			National regulations update, CAA monitoring
1832			Multistage process acceptance, process update
1833			International and state regulations, norms, audits, certification and their updates
1834			International and state regulations, norms, audits, certification and their updates
1835			Certification, market pressure, regulations update, customer feedback
1836			Certification of product and menufacturer, market pressure, CAA monitoring, audits
1837			CAA monitoring, EU and state regulations, voluntary reporting
1838			CAA monitoring, certification, staff experience
1839			CAA monitoring state norms and regulations.
1840			Air carrier organisation, state labour rgulations, labour unions
1901	ESD21	Weather forecast, flight plan, navigation aids, Tower guidance	Voluntary reporting system, state authorities scrutiny
1902		Seat design, pilot physical tests	State labor regulations, labor unions, ATM work organisation



	ESD	Occurrences (Uneventful Events)	Deviations (Procedural/Flight Path)
1903		Runway state monitoring, Airport safety program, weather forecast	Staff training, certification
1904		Pilot training, aircraft tracking by airport tower	Staff training
1905		Pilot training, weather forecast, flight plan, ATM guidance, navigation aids	Staff training
1906		Pilot training, ILS, Tower guidance, glideslope	Staff training
1907		Pilot training, ILS, Tower guidance, fail-safe design	Software quality assurance, tests, user training
1908		Pilot training, ILS, Tower guidance	Requirements evaluation, multistage acceptance, voluntary reporting
1909		Pilot training, aircraft design	Reporting system, procedure updates and evalutaion
1910		Pilot training incl. IFR flights, ATM guidance, navigation aids, pilot training	Pilot training, responsibility, tower guidance to limited extent
1911		Pilot training	Pilot training, responsibility, tower guidance
1912		Flight plan, weather forecast, weather radar, ATM guidance	Pilot training, responsibility, tower guidance
1913		Aircraft maintenance checks, fail-safe design	Pilot training, qualification certification, cockpit design
1914		Aircraft maintenance checks	Pilot training, multiple information source
1915			Pilot training, instrument panel aids
1916			Pilot training, ILS, instrument panel aids
1917			Pilot training, fool-proof design
1918			Pilot training, fly-by-wire, information in cockpit for pilot
1919			Pilot training, control design, fly-by-wire/light
1920			Pilot training, control design
1921			Pilot training, control design
1922			Pilot training, control design
1923			Pilot training, control design
1924			Pilot training, ATC cooperation
1925			Pilot training, aircraft control design
1926			Pilot training and experience
1927			Pilot training
1928			National regulations update, CAA monitoring
1929			Multistage process acceptance, process update
1930			International and state regulations, norms, audits, certification and their updates
1931			Certification, market pressure, regulations update, customer feedback
1932			Certification of product and menufacturer, market pressure, CAA monitoring, audits
1933			CAA monitoring, EU and state regulations, voluntary reporting
1934			CAA monitoring, certification, staff experience
1935			CAA monitoring state norms and regulations.



	ESD	Occurrences (Uneventful Events)	Deviations (Procedural/Flight Path)
1936			Air carrier organisation, state labour rgulations, labour unions
2001	ESD23	Weather monitoring, Tower guidance, pilot training	Voluntary reporting system, state authorities scrutiny
2002		Aircraft maintenance checks	Tower staff training
2003		Aircraft maintenance checks, fail-safe design	State labor regulations, labor unions, ATM work organisation
2004		Pilot training, ILS, Tower guidance, fail-safe design	State labor regulations, labor unions, ATM work organisation
2005		Pilot training, ILS, Tower guidance, glideslope	Staff training
2006		wather forecast, pilot training, ATM guidance	Staff training
2007		Pilot training, ILS, Tower guidance	Staff training
2008		Flight plan, weather forecast, weather radar, ATM	Requirements evaluation, multistage acceptance, voluntary
		guidance	reporting
2009		Tower guidance, wather forecast, pilot training	Requirements evaluation, multistage acceptance, voluntary reporting
2010		Pilot training, aircraft design	Reporting system, procedure updates and evalutaion
2011		Runway state monitoring, Airport safety program, weather forecast	Pilot training, responsibility, tower guidance
2012			Pilot training, qualification certification, cockpit design
2013			Pilot training, multiple information source
2014			Pilot training, instrument panel aids
2015			Pilot training, ILS, instrument panel aids
2016			Pilot training, fly-by-wire, information in cockpit for pilot
2017			Pilot training, control design
2018			Pilot training, control design
2019			Pilot training, control design
2020			Pilot training, control design
2021			Pilot training, ATC cooperation
2022			Pilot training and experience
2023			Multistage process acceptance, process update
2024			Multistage process acceptance, process update
2025			Multistage process acceptance, process update
2026			International and state regulations, norms, audits, certification and their updates
2027			Certification, market pressure, regulations update, CAA monitoring
2028			Certification of profuct and manufacturer, recipent test, reporting systems
2029			Certification of product and menufacturer, market pressure, CAA monitoring, audits
2030			CAA monitoring, audits CAA monitoring, state regulations
2031			CAA monitoring, State regulations CAA monitoring, EU and state regulations, voluntary
			reporting



	ESD	Occurrences (Uneventful Events)	Deviations (Procedural/Flight Path)
2032			CAA monitoring, certification, staff experience
2033			ATC guidance, weather monitoring
2034			Air carrier organisation, state labour rgulations, labour unions
2101	ESD25	Weather monitoring, Tower guidance, pilot training	Voluntary reporting system, state authorities scrutiny
2102		Pilot training, ILS, Tower guidance, glideslope	State labor regulations, labor unions, ATM work organisation
2103		Flight plan, weather forecast, weather radar, ATM guidance	Staff training
2104		Weather forecast, flight plan, navigation aids, Tower guidance	Staff training
2105		Pilot training, aircraft tracking by airport tower	Requirements evaluation, multistage acceptance, voluntary reporting
2106		Pilot training, aircraft design	Pilot training, responsibility, tower guidance
2107			Pilot training, ILS, instrument panel aids
2108			Pilot training, control design, fly-by-wire/light
2109			Pilot training, ATC cooperation
2110			Pilot training and experience
2111			Pilot training
2112			Multistage process acceptance, process update
2113			Certification of product and menufacturer, market pressure,
			CAA monitoring, audits
2114			CAA monitoring, certification, staff experience
2115			ATC guidance, weather monitoring
2116			Air carrier organisation, state labour rgulations, labour unions
2201	ESD26	Pilot training, aircraft design	Voluntary reporting system, state authorities scrutiny
2202		Weather monitoring, Tower guidance, pilot training	State labor regulations, labor unions, ATM work organisation
2203		Aircraft maintenance checks	Staff training
2204		Flight plan, weather forecast, weather radar, ATM guidance	Staff training
2205		Runway state monitoring, Airport safety program, weather forecast	Staff training
2206			Requirements evaluation, multistage acceptance, voluntary reporting
2207		70 1111 0	Reporting system, procedure updates and evalutaion
2208			Pilot training, responsibility, tower guidance to limited extent
2209			Pilot training, responsibility, tower guidance
2210			Pilot training, qualification certification, cockpit design
2211			Pilot training, ILS, instrument panel aids
2212			Pilot training, control design



	ESD	Occurrences (Uneventful Events)	Deviations (Procedural/Flight Path)
2213			Pilot training, control design
2214			Pilot training, control design
2215			Pilot training, control design
2216			Pilot training, computerised control aid
2217			Pilot training, computerised control aid
2218			Pilot training, ATC cooperation
2219			Pilot training and experience
2220			Pilot training
2221			Pilot training
2222			CAA monitoring, EU and state regulations, voluntary reporting
2223			ATC cooperation, pilot training
2224			Air carrier organisation, state labour rgulations, labour unions
2301	ESD27	Airport security program, active observation and deterrence of wildlife	Voluntary reporting system, state authorities scrutiny
2302		Work organisation, state labor regulations, unions, labor audits/inspections	Voluntary reporting system, CAA monitoring
2303		Tire maintenance, replacement, runway state monitoring	State labor regulations, labor unions, ATM work organisation
2304		Aircraft maintenance checks, fail-safe design	Staff training
2305		Manuals, state regulations, audits	Requirements evaluation, multistage acceptance, voluntary reporting
2306		Runway state monitoring, Airport safety program	Multistage process acceptance, process update
2307		Airport wildlife deterrence program	Certification of product and menufacturer, market pressure,
2200			CAA monitoring, audits
2308			CAA monitoring, certification, staff experience
2309			CAA monitoring
2310			Air carrier organisation, state labour rgulations, labour unions
2701	ESD31	Pilot training, navigational aids, ATM guidance	Voluntary reporting system, state authorities scrutiny
2702		Display maintenance, checks, design, pilot training	Voluntary reporting system, state authorities scrutiny
2703		Aircraft maintenance checks, fail-safe design	Very high pressure to avoid financial and loss of pax godwill consequences
2704		Communication Systems maintenance and design,	Tests, evaluation, update
2705		ATM guidance, radar, pilot training, procedures, transponder	State labor regulations, labor unions, work organisation, safety culture
2706		TCAS equipment maintenance	State labor regulations, labor unions, ATM work organisation
2707		Weather forecast, Towe and ATM guidance	State labor regulations, labor unions, ATM work organisation
2708		Flight plan, weather forecast, weather radar, ATM guidance	Staff training, staff cooperation
2709		ATM guidance, radar, pilot training, procedures, transponder, air defence	Staff training, fool-proof design



1	ESD	Occurrences (Uneventful Events)	Deviations (Procedural/Flight Path)
2710		Pilot training incl. IFR flights, ATM guidance, navigation aids, pilot training	Staff training, communication equipment reuirements, maintenance
2711		and s, prior training	Staff training and experience
2712			Staff training
2713			Staff training
2714			Staff training
2715			Staff training
		_	ŭ .
2716			Staff experience, reporting system, process evaluation and update
2717			Staff experience, reporting system, process evaluation and update
2718			Requirements evaluation, multistage acceptance, voluntary reporting
2719			Requirements evaluation, multistage acceptance, voluntary reporting
2720			Quality assurance (e.g. FMEA), customer feedback, market pressure
2721			Pressure to get permissions for operations, market pressure
2722			Piot training, aircarft tracking and ATM cooperation
2723			Pilota and ATC training
2724			Pilot training, staff training and cooperation
2725			Pilot training, notification in instrument
2726			Pilot training
2727			Pilot qulification tests, training programmes, certificates
2728			National regulations update, CAA monitoring
2729			Multistage process acceptance, process update
2730			Multistage process acceptance, process update
2731			Multistage process acceptance, process update
2732			Multistage process acceptance, process update
2733			Multistage process acceptance, process update
2734			Multistage process acceptance, process update
2735			Multistage process acceptance, process update
2736			Multiple information sources, GPS, nav beacons, ATM cooperation, pilot training
2737			International agreements, government policies avoiding war,
,			ATC airspace monitoring, civil cooperation with air force
2738			Flight plan acceptance by authorities, AC airspace
			monitoring, transponers in GA aircraft
2739			Consultations on design stage, evaluation and update



	ESD	Occurrences (Uneventful Events)	Deviations (Procedural/Flight Path)
2740			Certification, Recipient test, reporting system
2741			Certification, market pressure, regulations update, CAA
			monitoring
2742			Certification, market pressure, regulations update, CAA
			monitoring
2743			Certification of product and manufacturer, market pressure,
			CAA monitoring, audits
2744			Certification of product and manufacturer, market pressure,
			CAA monitoring, audits
2745			Callibration, mainenance, pre-flight check.
2746			CAA monitoring, certification, staff experience
2747			CAA monitoring, certification, staff experience
2748			Audits, periodic evaluation and update
2749			ATC training
2750			Altitude monitoring, various sorces of information for pilot and ATM
2751			Airport tower airspace monitoring, transponders installed in
			GA aircraft
2752			Aircraft tracking by ATM, transponders, navigation aids, pilot
			training
2753			Air staff and ATM staff training
2754			Air carrier organisation, state labour rgulations, labour
			unions
2801	ESD32	Work organisation, state labor regulations, unions, labor audits/inspections	Voluntary reporting system, state authorities scrutiny
2802		Tower guidance, taxiway marking, pilot training	Voluntary reporting system, state authorities scrutiny
2803		Pilot training, signs on the runway	Voluntary reporting system, state authorities scrutiny
2804		Pilot training, Tower guidance	Tower guidance, aircraft training, pilot traning
2805		Manuals, state regulations, audits	State regulations, norms, audits, certification
2806		Aircraft maintenance, A, B, C, D-checks	State labor regulations, labor unions, ATM work organisation
2807		Pilot training incl. IFR flights, ATM guidance, navigation aids, pilot training	State labor regulations, labor unions, ATM work organisation
2808		aius, pilot training	Staff training, organisation audits, CAA monitoring
2809			Staff training, communication equipment reuirements,
			maintenance
2810			Staff training
2811			Staff training
2812	+		Staff training
2813	1		Staff training
2814			Requirements evaluation, multistage acceptance, voluntary reporting
2815			Requirements evaluation, multistage acceptance, voluntary
			reporting



	ESD	Occurrences (Uneventful Events)	Deviations (Procedural/Flight Path)
2816		Ì	Process evaluation, multistage acceptance, voluntary
			reporting
2817			Pilot traning, tower guidance, aircraft tracking
2818			Pilot traning, tower guidance, aircraft tracking
2819			Pilot traning, tower guidance, aircraft tracking
2820			Pilot traning, tower guidance, aircraft tracking
2821			Pilot traning, tower guidance, aircraft tracking
2822			Pilot training, tower ATM training
2823			Pilot training, pilot legal responsibility
2824			Pilot training, pilot legal responsibility
2825			Pilot training, legal responsibility, tower guidance
2023			i not training, legal responsibility, tower guidance
2826			Pilot qulification tests, training programmes, certificates
2827			Multistage process acceptance, process update
2828			Multistage process acceptance, process update
2829			International and state regulations, norms, audits,
			certification and their updates
2830			International and state regulations, norms, audits,
			certification and their updates
2831			EU level and state level requirements, airport safety
			programme
2832			CAA monitoring
2833			ATM training, pilot training
2834			ATC training
2835			Alphabet pronunciation standards, staff training, communication equipment standards
2836			Air staff and ATM staff training
2837			Air carrier organisation, state labour rgulations, labour unions
3001	ESD35	Aircraft maintenance checks, fail-safe design	Voluntary reporting systems, CAA coperation with users
3002		Communication Systems maintenance and design,	Voluntary reporting system, state authorities scrutiny
3003		Runway state monitoring	State labor regulations, labor unions, ATM work organisation
3004		Pilot training, ATM and tower guidance, flight plan, Navigation aids	State labor regulations, labor unions, ATM work organisation
3005		ground installation maintenance	Staff training, organisation culture, management monitoring
3006		air carrier organisation, pilot training	Staff training, communication equipment reuirements, maintenance
3007		Equipment maintenance	Staff training, audits, CAA monitoring, state norms and regulations



Navigation aids Maintenance staff training, database design, backups, database backlogs 3010 Pilot training incl. IFR flights, ATM guidance, navigation staff training aids, pilot training aids, pilot training 3011 Staff training 3012 Staff training 3013 Requirements evaluation, multistage acceptance, voluntary reporting 3014 Requirements evaluation, multistage acceptance, voluntary reporting 3015 Reporting system, procedure updates and evalutation 3016 Process evaluation, multistage acceptance, voluntary reporting 3017 Reporting system, procedure updates and evalutation 3018 Process evaluation, multistage acceptance, voluntary reporting 3019 Process evaluation, multistage acceptance, voluntary reporting 3010 Process evaluation, multistage acceptance, voluntary reporting 3010 Process evaluation, multistage acceptance, voluntary reporting 3011 Process evaluation, multistage acceptance, voluntary reporting 3012 Process evaluation, multistage acceptance, voluntary reporting 3014 Process evaluation, multistage acceptance, voluntary reporting 3015 Process evaluation, multistage acceptance, process update and process acceptance, process update and process acceptance, process update 3020 Process evaluation with Tower, aircraft tracking 3021 Process evaluation awarness, communication between pilot and ATM 3025 Process acceptance, process update 3036 Process acceptance, process update 3037 Process evaluation awarness, acceptance, process update 3038 Multistage process acceptance, process update 3039 Multistage process acceptance, process update 3030 Multistage process acceptance, process update 3031 Process evaluation awarness, acceptance, process update 3032 Multistage process acceptance, process update 3033 Process evaluation, market pressure, regulations update, customer reedback 3036 Process evaluation, market pressure, CAA monitoring, regulations update, customer reedback		ESD	Occurrences (Uneventful Events)	Deviations (Procedural/Flight Path)
database backlogs Pilot training incl. IFR flights, ATM guidance, navigation slots, pilot training incl. IFR flights, ATM guidance, navigation Staff training 3012 3013 Staff training 3014 Requirements evaluation, multistage acceptance, voluntary reporting 3015 Requirements evaluation, multistage acceptance, voluntary reporting 3016 Reporting system, procedure updates and evalutation 3016 Process evaluation, multistage acceptance, voluntary reporting 3017 Reporting system, procedure updates and evalutation 3016 Pilot training, routine 3019 Pilot training, routine Pilot training, routine Pilot training, communication with Tower, aircraft tracking 3020 Pilot training, communication with Tower, aircraft tracking 3021 Pilot training, communication with Tower, aircraft tracking 3022 Pilot training Pilot training Pilot training 3024 Pilot training Pilot training Pilot training Pilot training Pilot training Multistage process acceptance, process update 3026 Multistage process acceptance, process update 3030 Multistage process acceptance, process update 3031 Multistage process acceptance, process update 3032 Multistage process acceptance, process update 3033 Multistage process acceptance, process update 3034 Multistage process acceptance, process update 3035 Multistage process acceptance, process update 3036 Multistage process acceptance, process update 3037 Multistage process acceptance, process update 3038 Multistage process acceptance, process update 3039 Certification, market pressure, CAA monitoring, regulations update, Catification, market pressure, CAA monitoring, regulations update 3037 Certification, market pressure, CAA monitoring, regulations update 3037 Certification, market pressure, CAA monitoring, regulations update 3039 Certification, market pressure, CAA monitoring, regulations update 3030 Certification, market pressure, CAA monitoring, regulations 3031	3008			Staff training
aids, pilot training Staff training Staff training Staff training Requirements evaluation, multistage acceptance, voluntary reporting Requirements evaluation, multistage acceptance, voluntary reporting Reporting system, procedure updates and evaluation Reporting system, procedure updates and evaluation Reporting system, procedure updates and evaluation Process evaluation, multistage acceptance, voluntary reporting Reporting system, procedure updates and evaluation Process evaluation, multistage acceptance, voluntary reporting Process evaluation, multistage acceptance, voluntary reporting Process evaluation, multistage acceptance, voluntary reporting Process evaluation, multistage acceptance, voluntary reporting Process evaluation, multistage acceptance, voluntary reporting Process evaluation, multistage acceptance, voluntary reporting Process evaluation, multistage process acceptance, process update Process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Certification, market pressure, CAA monitoring, regulations update. Certification, market pressure, CAA monitoring, regulations update. Certification, market pressure, CAA monitoring,	3009			Staff training
Staff training Requirements evaluation, multistage acceptance, voluntary reporting Requirements evaluation, multistage acceptance, voluntary reporting Requirements evaluation, multistage acceptance, voluntary reporting Reporting system, procedure updates and evaluation Reporting system, procedure updates and evaluation Reporting system, procedure updates and evaluation Reporting system, procedure updates and evaluation Reporting system, procedure updates and evaluation Reporting system, procedure updates and evaluation Reporting system, procedure updates and evaluation Reporting system, procedure updates and evaluation Reporting system, procedure updates and evaluation Reporting system, procedure updates and evaluation Reporting system, procedure updates and evaluation Reporting system, procedure updates and evaluation Reporting system, procedure updates, voluntary reporting Reporting system, procedure updates, or pliot training, responsibility, tower guidance Pilot training, communication with Tower, aircraft tracking Reporting system, process update Pilot training Reporting system, process update Requirements evaluation, multistage acceptance, process update Requirements evaluation, multistage process acceptance, process update Requirements evaluation, multistage process update Requirements evaluation, multistage process update Requirements evaluation, multistage process update Requirements evaluation, multistage process update, customer feedback Certification, market pressure, CAA monitoring, regulations update Certification, market pressure, CAA monitoring, regulations update	3010			Staff training
Requirements evaluation, multistage acceptance, voluntary reporting 3014 Requirements evaluation, multistage acceptance, voluntary reporting 3015 Reporting system, procedure updates and evaluation 3016 Process evaluation, multistage acceptance, voluntary reporting 3017 Pilot training, routine 3018 Pilot training, responsibility, tower guidance 3019 Pilot training, responsibility, tower guidance 3010 Pilot training, communication with Tower, aircraft tracking 3020 Pilot training, communication with Tower, aircraft tracking 3021 Pilot training 3022 Pilot training 3023 Pilot training 3024 Pilot studional awarness, communication between pilot and ATM 3025 Pilot quilification tests, training programmes, certificates 3026 Pilot and other staff training, staff cooperation 3027 National regulations update, CAA monitoring 3028 Multistage process acceptance, process update 3030 Multistage process acceptance, process update 3031 Multistage process acceptance, process update 3032 Multistage process acceptance, process update 3033 Multistage process acceptance, process update 3034 Certification, market pressure, guidabnce, pilot 3035 Certification, market pressure, regulations update, customer 3036 Certification, market pressure, CAA monitoring, regulations 3037 Certification, market pressure, CAA monitoring, regulations	3011			Staff training
reporting Requirements evaluation, multistage acceptance, voluntary reporting 3015 Reporting system, procedure updates and evaluation 3016 Process evaluation, multistage acceptance, voluntary reporting 3017 Reporting system, procedure updates and evalutation 3018 Process evaluation, multistage acceptance, voluntary reporting Pilot training, routine Pilot training, responsibility, tower guidance Pilot training, fool-proof design Pilot training, communication with Tower, aircraft tracking Pilot training, communication with Tower, aircraft tracking Pilot training 3021 Pilot training Pilot training Pilot training Pilot training Pilot quilification tests, training programmes, certificates Pilot quilification tests, training programmes, certificates Pilot and other staff training, staff cooperation Antional regulations update, CAA monitoring Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Certification, Recipient test, reporting system Certification, Recipient test, reporting system Certification, market pressure, CAA monitoring, regulations update Certification, market pressure, CAA monitoring, regulations Update Certification, market pressure, CAA monitoring, regulations	3012			Staff training
Requirements evaluation, multistage acceptance, voluntary reporting Reporting system, procedure updates and evaluation Reporting system, procedure updates and evaluation Process evaluation, multistage acceptance, voluntary reporting Reporting system, procedure updates and evaluation Process evaluation, multistage acceptance, voluntary reporting Reporting system, procedure updates and evaluation Process evaluation, multistage acceptance, voluntary reporting Reporting system, procedure updates and evaluation Process evaluation, multistage acceptance, voluntary reporting Reporting system, process evaluation, multistage acceptance, voluntary reporting Pilot training, responsibility, tower guidance Pilot training, responsibility, tower guidance Pilot training, communication with Tower, aircraft tracking Pilot training, communication with Tower, aircraft tracking Pilot training Pilot training Pilot training Pilot training Pilot training Pilot training Pilot situational awarness, communication between pilot and ATM Pilot quilification tests, training programmes, certificates Pilot and other staff training, staff cooperation National regulations update, CAA monitoring Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Certification, Recipient test, reporting system Certification, market pressure, CAA monitoring, regulations update Certification, market pressure, CAA monitoring, regulations Update Certification, market pressure, CAA monitoring, regulations	3013			
3016 Process evaluation, multistage acceptance, voluntary reporting 3017 Pilot training, routine 3018 Pilot training, responsibility, tower guidance 3019 Pilot training, fool-proof design 3020 Pilot training, fool-proof design 3020 Pilot training, communication with Tower, aircraft tracking 3021 Pilot training, communication with Tower, aircraft tracking 3022 Pilot training 3023 Pilot training 3024 Pilot training 3025 Pilot training 3026 Pilot and awarness, communication between pilot and ATM 3025 Pilot quilification tests, training programmes, certificates 3026 Pilot and other staff training, staff cooperation 3027 National regulations update, CAA monitoring 3028 Multistage process acceptance, process update 3030 Multistage process acceptance, process update 3031 Multistage process acceptance, process update 3031 Multistage process acceptance, process update 3032 Multistage process acceptance, process update 3033 LS, glideslope, Aircraft tracking 3034 Certification, market pressure, regulations update, customer feedback 3036 Certification, market pressure, CAA monitoring, regulations update 3037 Certification, market pressure, CAA monitoring, regulations	3014			Requirements evaluation, multistage acceptance, voluntary
reporting Pilot training, routine Pilot training, responsibility, tower guidance Pilot training, fool-proof design 3020 Pilot training, communication with Tower, aircraft tracking Pilot training, communication with Tower, aircraft tracking Pilot training, communication with Tower, aircraft tracking Pilot training Pilot trai	3015			
Pilot training, routine Pilot training, responsibility, tower guidance Pilot training, responsibility, tower guidance Pilot training, col-proof design Pilot training, communication with Tower, aircraft tracking Pilot training, communication with Tower, aircraft tracking Pilot training Pilot training Pilot training Pilot training Pilot training Pilot training Pilot situational awarness, communication between pilot and ATM Pilot quilification tests, training programmes, certificates Pilot and other staff training, staff cooperation National regulations update, CAA monitoring Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Certification, Aircraft tracking, Tower guidabnce, pilot instruments, training Ocertification, Recipient test, reporting system Certification, market pressure, regulations update, customer feedback Certification, market pressure, CAA monitoring, regulations update Certification, market pressure, CAA monitoring, regulations update	3016			
Pilot training, responsibility, tower guidance	3017			· -
Pilot training, fool-proof design				C.
Pilot training, communication with Tower, aircraft tracking Pilot training, communication with Tower, aircraft tracking Pilot training Pilot training Pilot training Pilot situational awarness, communication between pilot and ATM Pilot qulification tests, training programmes, certificates Pilot and other staff training, staff cooperation National regulations update, CAA monitoring Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Certification, Recipient test, reporting system Certification, market pressure, regulations update, customer feedback Certification, market pressure, CAA monitoring, regulations update				
3022 Pilot training 3024 Pilot training 3024 Pilot situational awarness, communication between pilot and ATM 3025 Pilot qulification tests, training programmes, certificates 3026 Pilot and other staff training, staff cooperation 3027 National regulations update, CAA monitoring 3028 Multistage process acceptance, process update 3029 Multistage process acceptance, process update 3030 Multistage process acceptance, process update 3031 Multistage process acceptance, process update 3032 Multistage process acceptance, process update 3033 Cattle Staff	3020			
Pilot training Pilot situational awarness, communication between pilot and ATM Pilot qulification tests, training programmes, certificates Pilot and other staff training, staff cooperation Pilot and other staff training, staff cooperation National regulations update, CAA monitoring Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Certification, process update Certification, Recipient test, reporting system Certification, Recipient test, reporting system Certification, market pressure, regulations update, customer feedback Certification, market pressure, CAA monitoring, regulations update Certification, market pressure, CAA monitoring, regulations update Certification, market pressure, CAA monitoring, regulations update	3021			Pilot training, communication with Tower, aircraft tracking
3024 Pilot situational awarness, communication between pilot and ATM 3025 Pilot qulification tests, training programmes, certificates 3026 Pilot and other staff training, staff cooperation 3027 National regulations update, CAA monitoring 3028 Multistage process acceptance, process update 3029 Multistage process acceptance, process update 3030 Multistage process acceptance, process update 3031 Multistage process acceptance, process update 3032 Multistage process acceptance, process update 3033 Carried State of S	3022			Pilot training
ATM 3025 Pilot qulification tests, training programmes, certificates 3026 Pilot and other staff training, staff cooperation 3027 National regulations update, CAA monitoring 3028 Multistage process acceptance, process update 3029 Multistage process acceptance, process update 3030 Multistage process acceptance, process update 3031 Multistage process acceptance, process update 3032 Multistage process acceptance, process update 3033 Multistage process acceptance, process update 3034 Certification, Recipient test, reporting system 3035 Certification, market pressure, regulations update, customer feedback 3036 Certification, market pressure, CAA monitoring, regulations update 3037 Certification, market pressure, CAA monitoring, regulations	3023			Pilot training
Pilot and other staff training, staff cooperation National regulations update, CAA monitoring Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Certification, Aircraft tracking, Tower guidabnce, pilot instruments, training Certification, Recipient test, reporting system Certification, market pressure, regulations update, customer feedback Certification, market pressure, CAA monitoring, regulations update Certification, market pressure, CAA monitoring, regulations update Certification, market pressure, CAA monitoring, regulations update Certification, market pressure, CAA monitoring, regulations	3024			
National regulations update, CAA monitoring Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update LLS, glideslope, Aircraft tracking, Tower guidabnce, pilot instruments, training Certification, Recipient test, reporting system Certification, market pressure, regulations update, customer feedback Certification, market pressure, CAA monitoring, regulations update Certification, market pressure, CAA monitoring, regulations update Certification, market pressure, CAA monitoring, regulations update	3025			Pilot qulification tests, training programmes, certificates
Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update CETIFICATION (Tower guidabnce, pilot instruments, training) CETIFICATION, Recipient test, reporting system CETIFICATION, Market pressure, regulations update, customer feedback CETIFICATION, market pressure, CAA monitoring, regulations update CETIFICATION, market pressure, CAA monitoring, regulations update	3026			Pilot and other staff training, staff cooperation
Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update ILS, glideslope, Aircraft tracking, Tower guidabnce, pilot instruments, training Certification, Recipient test, reporting system Certification, market pressure, regulations update, customer feedback Certification, market pressure, CAA monitoring, regulations update Certification, market pressure, CAA monitoring, regulations update Certification, market pressure, CAA monitoring, regulations	3027			National regulations update, CAA monitoring
Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update ILS, glideslope, Aircraft tracking, Tower guidabnce, pilot instruments, training Certification, Recipient test, reporting system Certification, market pressure, regulations update, customer feedback Certification, market pressure, CAA monitoring, regulations update Certification, market pressure, CAA monitoring, regulations update Certification, market pressure, CAA monitoring, regulations	3028			Multistage process acceptance, process update
Multistage process acceptance, process update Multistage process acceptance, process update Multistage process acceptance, process update ILS, glideslope, Aircraft tracking, Tower guidabnce, pilot instruments, training Certification, Recipient test, reporting system Certification, market pressure, regulations update, customer feedback Certification, market pressure, CAA monitoring, regulations update Certification, market pressure, CAA monitoring, regulations update Certification, market pressure, CAA monitoring, regulations	3029			Multistage process acceptance, process update
Multistage process acceptance, process update ILS, glideslope, Aircraft tracking, Tower guidabnce, pilot instruments, training Certification, Recipient test, reporting system Certification, market pressure, regulations update, customer feedback Certification, market pressure, CAA monitoring, regulations update Certification, market pressure, CAA monitoring, regulations update Certification, market pressure, CAA monitoring, regulations	3030			Multistage process acceptance, process update
3033 ILS, glideslope, Aircraft tracking, Tower guidabnce, pilot instruments, training 3034 Certification, Recipient test, reporting system 3035 Certification, market pressure, regulations update, customer feedback 3036 Certification, market pressure, CAA monitoring, regulations update 3037 Certification, market pressure, CAA monitoring, regulations	3031			Multistage process acceptance, process update
instruments, training Certification, Recipient test, reporting system Certification, market pressure, regulations update, customer feedback Certification, market pressure, CAA monitoring, regulations update Certification, market pressure, CAA monitoring, regulations update Certification, market pressure, CAA monitoring, regulations	3032			Multistage process acceptance, process update
Certification, Recipient test, reporting system Certification, market pressure, regulations update, customer feedback Certification, market pressure, CAA monitoring, regulations update Certification, market pressure, CAA monitoring, regulations update Certification, market pressure, CAA monitoring, regulations	3033			
feedback Certification, market pressure, CAA monitoring, regulations update Certification, market pressure, CAA monitoring, regulations certification, market pressure, CAA monitoring, regulations	3034			, 6
3036 Certification, market pressure, CAA monitoring, regulations update 3037 Certification, market pressure, CAA monitoring, regulations	3035			
3037 Certification, market pressure, CAA monitoring, regulations	3036			Certification, market pressure, CAA monitoring, regulations
	3037			Certification, market pressure, CAA monitoring, regulations



	ESD	Occurrences (Uneventful Events)	Deviations (Procedural/Flight Path)
3038			Certification of product and manufacturer, market pressure,
			CAA monitoring, audits
3039			Certification of product and manufacturer, market pressure,
			CAA monitoring, audits
3040			Certification of product and manufacturer, market pressure,
			CAA monitoring, audits
3041			Callibration, mainenance, pre-flight check.
3042			CAA monitoring, state regulations
3043			CAA monitoring, certification, staff experience
3044			CAA monitoring, certification, staff experience
3045			CAA monitoring, certification, staff experience
3046			CAA monitoring, certification, staff experience
3047			CAA monitoring
3048			ATC training
3049			Aircraft tracking, Tower guidabnce, pilot instruments,
3043			training
3050			Aircraft tracking, ATM guidabnce, pilot instruments, training
3051			Aircraft tracking, ATM guidabnce, pilot instruments, training
3052			Air staff and ATM staff training
3053			Air carrier organisation, state labour rgulations, labour
			unions
3101	ESD36	Work organisation, state labor regulations, unions, labor audits/inspections	Voluntary reporting system, state authorities scrutiny
3102		Airport security	Tower guidance, aircraft training, pilot traning
3103		Tower guidance, taxiway marking, pilot training	State labor regulations, labor unions, ATM work organisation
3104		Tower guidance, aircraft training, pilot traning	State labor regulations, labor unions, ATM work organisation
3105		Tower guidance, aircraft training, pilot traning	Staff training, communication equipment reuirements,
			maintenance
3106		Tower guidance, aircraft training, pilot traning	Staff training
3107		Manuals, state regulations, audits	Staff training
3108		POA certificate, quality checks at factory and customer	Requirements evaluation, multistage acceptance, voluntary
		level	reporting
3109		Maintenance operation organisation, audits, staff	Requirements evaluation, multistage acceptance, voluntary
		training	reporting
3110		Pilot training incl. IFR flights, ATM guidance, navigation aids, pilot training	Pilot traning, tower guidance, aircraft tracking
3111			Pilot traning, tower guidance, aircraft tracking
3112			Pilot traning, tower guidance, aircraft tracking
	1		



	ESD	Occurrences (Uneventful Events)	Deviations (Procedural/Flight Path)
3114			Pilot traning, tower guidance, aircraft tracking
3115			Pilot traning, tower guidance, aircraft tracking
3116			Pilot training, tower ATM training
3117			Pilot training, fly-by-wire/light
3118			Pilot qulification tests, training programmes, certificates
3119			Multistage process acceptance, process update
3120			Multistage process acceptance, process update
3121			CAA monitoring
3122			ATC training
3123			Air staff and ATM staff training
3124			Air carrier organisation, state labour rgulations, labour
			unions



Step 5 – Link between defences/controls updated list and CATS ESD safety barriers

No.		Prevention (Detection/Recovery) to Occurrences (Uneventful Events)	Prevention (Detection/Recovery) to Deviations (Procedural/Flight Path)	CATS barriers
1	ESD1	Undercarriage maintenance	Voluntary reporting system, state authorities scrutiny	Aircraft System Integrity
2		runway state monitoring, airport safety program	Voluntary reporting system, CAA monitoring	RTO (procedure)
3		Runway state monitoring, Airport safety program	State labor regulations, labor unions, ATM work organisation	Maximum Braking (V <v1)< td=""></v1)<>
4		Engine maintenance, checks, design, pilot training	Staff training, communication equipment reuirements, maintenance	
5		Communication Systems maintenance and design,	Staff expertise, multistage process acceptance, process evaluation and update	
6		Avionics callibration, maintenance, design	Staff expertise, multistage process acceptance, process evaluation and update	
7		Aircraft systems maintenance, checks, design	Staff experience, safety culture, process evaluation and update	
8		Aircraft maintenance checks, fail-safe design	Staff experience, reporting system, process evaluation and update	
9		Aircraft maintenance checks, fail-safe design	Staff experience, reporting system, process evaluation and update	
10			Requirements evaluation, multistage acceptance, voluntary reporting	
11			Pilot training, tower guidance	
12			Pilot training, tower guidance	
13			Pilot training, tower guidance	
14			Pilot training, system design, test, callibration	
15			Pilot training, software Q&A	
16			Multistage process acceptance, process update	
17			Multistage process acceptance, process update	
18			Multistage process acceptance, process update	
19			Multistage process acceptance, process update	
20			Multistage process acceptance, process update	
21			Multistage process acceptance, process update	
22			Multistage process acceptance, process update	



No.	Prevention (Detection/Recovery) to Occurrences (Uneventful Events)	Prevention (Detection/Recovery) to Deviations (Procedural/Flight Path)	CATS barriers
23		Multistage process acceptance, process update	
24		Multistage process acceptance, process update	
25		Multistage process acceptance, process update	
26		Multistage process acceptance, process update	
27		Multistage process acceptance, process update	
28		Multistage process acceptance, process update	
29		Multistage process acceptance, process update	
30		Multistage process acceptance, process update	
31		Multistage process acceptance, process update	
32		Multiple information sources, GPS, nav beacons, ATM cooperation, pilot training	
33		Certification, tests, norms	
34		Certification, Recipient test, reporting system	
35		Certification, recipent tests, audits	
36		Certification, recipent tests, audits	
37		Certification, market pressure, regulations update, customer feedback	
38		Certification, market pressure	
39		Certification of product and menufacturer, market pressure, CAA monitoring, audits	
40		Certification of product and menufacturer, market pressure, CAA monitoring, audits	
41		Certification of product and menufacturer, market pressure, CAA monitoring, audits	
42		Certification of product and manufacturer, market pressure, CAA monitoring, audits	
43		Certification of product and manufacturer, market pressure, CAA monitoring, audits	



No.		Prevention (Detection/Recovery) to Occurrences (Uneventful Events)	Prevention (Detection/Recovery) to Deviations (Procedural/Flight Path)	CATS barriers
44			Certification of product and manufacturer, market pressure, CAA monitoring, audits	
45			Certification of product and manufacturer, market pressure, CAA monitoring, audits	
46			Certification of product and manufacturer, market pressure, CAA monitoring, audits	
47			Certification of product and manufacturer, market pressure, CAA monitoring, audits	
48			CAA monitoring, voluntary reporting	
49			CAA monitoring, EU and state regulations, voluntary reporting	
50			CAA monitoring, certification, staff experience	
51			CAA monitoring, certification, staff experience	
52			CAA monitoring, certification, staff experience	
53			CAA monitoring, certification, staff experience	
54			CAA monitoring, certification, staff experience	
55			CAA monitoring, certification, staff experience	
56			CAA monitoring, certification, staff experience	
57			CAA monitoring, certification, staff experience	
58			CAA monitoring, certification, staff experience	
59			CAA monitoring, certification, staff experience	
60			CAA monitoring, certification, staff experience	
61	1		Aircraft design, tests and certification	
62			Air carrier organisation, state labour rgulations, labour unions	
101	ESD2	Weather forecast, flight plan, navigation aids, Tower guidance	Voluntary reporting system, state authorities scrutiny	Air Traffic Hazard Avoidance
102		Tower guidance, aircraft training, pilot training	Voluntary reporting system, CAA monitoring	RTO



No.	Prevention (Detection/Recovery) to Occurrences (Uneventful Events)	Prevention (Detection/Recovery) to Deviations (Procedural/Flight Path)	CATS barriers
103	runway state monitoring, airport safety program	State labor regulations, labor unions, ATM work organisation	Maximum Braking (V <v1)< td=""></v1)<>
104	Runway state monitoring, Airport safety program	State labor regulations, labor unions, ATM work organisation	
105	Pilot training, airport safety program	Staff training, communication equipment reuirements, maintenance	
106	Airport wildlife deterrence program	Staff training	
107	Airport security program, active observation and deterrence of wildlife	Staff training	
108	Aircraft maintenance, A, B, C, D-checks	Staff training	
109	Aircraft maintenance checks, fail-safe design	Staff training	
110		Requirements evaluation, multistage acceptance, voluntary reporting	
111		Requirements evaluation, multistage acceptance, voluntary reporting	
112		Reporting system, procedure updates and evalutaion	
113		Process evaluation, multistage acceptance, voluntary reporting	
114		Piot training, aircraft tracking by ATC	
115		Pilot traning, tower guidance, aircraft tracking	
116		Pilot traning, tower guidance, aircraft tracking	
117		Pilot traning, tower guidance, aircraft tracking	
118		Pilot traning, tower guidance, aircraft tracking	
119		Pilot training, tower guidance	
120		Pilot training, tower guidance	
121		Pilot training, system design, test, callibration	
122		Pilot training, staff training and cooperation	
123		Pilot training, software Q&A	
124		Pilot training, pilot legal responsibility	
125		Pilot training, pilot legal responsibility	
126		Pilot training, monitoring by ATC	
127		Pilot training, legal responsibility, tower guidance	
128		Pilot qulification tests, training programmes, certificates	



No.		Prevention (Detection/Recovery) to Occurrences (Uneventful Events)	Prevention (Detection/Recovery) to Deviations (Procedural/Flight Path)	CATS barriers
129			Consultations on design stage, evaluation and update	
130			Certification, market pressure	
131			CAA monitoring, voluntary reporting	
132			CAA monitoring, EU and state regulations, voluntary reporting	
133			CAA monitoring	
134			ATC training	
135			Air staff and ATM staff training	
136			Air carrier organisation, state labour rgulations, labour unions	
201	ESD3	Weather forecast, flight plan, navigation aids, Tower guidance	Voluntary reporting system, state authorities scrutiny	Take-off Roll Handling
202		Runway state monitoring, Airport safety program, weather forecast	Voluntary reporting system, CAA monitoring	RTO (procedure)
203		runway state monitoring, airport safety program	State labor regulations, labor unions, ATM work organisation	Maintain Control (V <v1)< td=""></v1)<>
204		Runway state monitoring, Airport safety program	Staff training	Maximum Braking (V <v1)< td=""></v1)<>
205		Aircraft maintenance checks, fail-safe design	Staff training	Maintain Control
206			Requirements evaluation, multistage acceptance, voluntary reporting	
207			Pilot training, tower guidance	
208			Pilot training, tower guidance	
209			Pilot training, tower guidance	
210			Pilot training, system design, test, callibration	
211			Pilot training, software Q&A	
212			Pilot training, monitoring by ATC	
213			Pilot training, computerised control aid, monitoring by ATC	
214			Pilot training, aircraft control design	
215			Certification, market pressure	
216			CAA monitoring, voluntary reporting	
217			CAA monitoring, EU and state regulations, voluntary reporting	
218			ATC cooperation, pilot training	
219			Air carrier organisation, state labour rgulations, labour unions	
301	ESD4	Tire maintenance, replacement, runway state monitoring	Voluntary reporting system, state authorities scrutiny	Directional Control Systems Integrity
302		runway state monitoring, airport safety program	Voluntary reporting system, CAA monitoring	RTO (procedure)



No.		Prevention (Detection/Recovery) to Occurrences (Uneventful Events)	Prevention (Detection/Recovery) to Deviations (Procedural/Flight Path)	CATS barriers
303		Runway state monitoring, Airport safety program	State labor regulations, labor unions, ATM work organisation	Maintain Control (V <v1)< td=""></v1)<>
304		Aircraft maintenance checks, fail-safe design	Requirements evaluation, multistage acceptance, voluntary reporting	Maximum Braking (V <v1)< td=""></v1)<>
305			Pilot training, tower guidance	Maintain Control
306			Pilot training, tower guidance	
307			Pilot training, tower guidance	
308			Pilot training, system design, test, callibration	
309			Pilot training, software Q&A	
310			Pilot training, computerised control aid, monitoring by ATC	
311			Multistage process acceptance, process update	
312			Multistage process acceptance, process update	
313			Certification, market pressure	
314			Certification, market pressure	
315			Certification of product and menufacturer, market pressure, CAA monitoring, audits	
316			CAA monitoring, voluntary reporting	
317			CAA monitoring, EU and state regulations, voluntary reporting	
318			CAA monitoring, certification, staff experience	
319			Air carrier organisation, state labour rgulations, labour unions	
401	ESD5	Runway state monitoring, Airport safety program, weather forecast	Voluntary reporting system, state authorities scrutiny	Take-off configuration setting and verified
402		Maintenance staff training, aircraft visual check prior to take-off	Voluntary reporting system, state authorities scrutiny	Take-Off Configuration Warning
403		Flight plan, weather forecast, weather radar, ATM guidance	Voluntary monitoring, state regulations	RTO (procedure)
404		Avionics maintenance, design	Voluntary monitoring, state regulations	Maximum Braking (V <v1)< td=""></v1)<>
405		Aircraft maintenance checks, fail-safe design	State labor regulations, labor unions, ATM work organisation	Stall avoidance (V <v1)< td=""></v1)<>
406		Aircraft maintenance checks, fail-safe design	Staff training, tower guidance, cockpit design	Control recovery (V <v1)< td=""></v1)<>
407			Staff training, tower guidance	Take-off configuration setting and verified
408			Staff training	Take-off configuration warning
409			Staff training	Take-off rejected
410			Staff training	Maximum braking



No.	Prevention (Detection/Recovery) to Occurrences (Uneventful Events)	Prevention (Detection/Recovery) to Deviations (Procedural/Flight Path)	CATS barriers
411		Staff experience, reporting system, process evaluation and update	Stall Avoidance
412		Requirements evaluation, multistage acceptance, voluntary reporting	Control Recovery
413		Quality assurance (e.g. FMEA), reporting systems, process update	
414		Process evaluation, multistage acceptance, voluntary reporting	
415		Pilot training, tower guidance	
416		Pilot training, tower guidance	
417		Pilot training, tower guidance	
418		Pilot training, tower guidance	
419		Pilot training, system design, test,	
		callibration	
420		Pilot training, publications of accident reports	
421		Pilot training, fly-by-wire/light	
422		Pilot training, automation	
423		Pilot training, automation	
424		Pilot training, aircraft control design	
425		Pilot training	
426		Pilot training	
427		Multistage process acceptance, process update	
428		Multistage process acceptance, process update	
429		Multistage process acceptance, process update	
430		Multistage process acceptance, process update	
431		Multistage process acceptance, process update	
432		Computerised checklist, external aircraft ground crew checks	
433		Certification, tests, Quality assurance	
434		Certification, tests, Quality assurance	
435		Certification, tests, norms	
436		Certification, Recipient test. Report system.	
437		Certification, market pressure	
438		CAA monitoring, voluntary reporting	
439		CAA monitoring, EU and state regulations, voluntary reporting	
		Aircraft design, tests and certification	1



No.		Prevention (Detection/Recovery) to Occurrences (Uneventful Events)	Prevention (Detection/Recovery) to Deviations (Procedural/Flight Path)	CATS barriers
441			Air carrier organisation, state labour rgulations, labour unions	
501	ESD6	Work organisation, state labor regulations, unions, labor audits/inspections	Voluntary reporting system, state authorities scrutiny	Pre-Service De-icing Procedure
502		Weather forecast, flight plan, navigation aids, Tower guidance	State labor regulations, labor unions, ATM work organisation	Pre-Flight De-icing Procedure
503		Pilot training, weather forecast, flight plan, ATM guidance, navigation aids	Staff training, tower guidance	Post Push-Back De-icing Procedure
504		Manuals, state regulations, audits	Staff training, safety culture, pre-flight checks	Stall Avoidance
505		Maintenance staff training, aircraft visual check prior to take-off	Staff training	
506		Maintenance staff training	Staff training	
507		Flight plan, weather forecast, weather radar, ATM guidance	Requirements evaluation, multistage acceptance, voluntary reporting	
508		Flight plan, weather forecast, weather radar, ATM guidance	Process evaluation, multistage acceptance, voluntary reporting	
509		Aircraft maintenance checks, fail-safe design	Pilot training, aircraft control design	
510			Pilot training	
511			Pilot and maintenance training, staff cooperation	
512			Multistage process acceptance, process update	
513			Multistage process acceptance, process update	
514			Certification, tests, Quality assurance	
515			Certification, Recipient test. Report system.	
516			Certification, recipent tests	
517			Aircraft design, tests and certification	
518			Air carrier organisation, state labour rgulations, labour unions	
701	ESD8	Weather forecast, flight plan, navigation aids, Tower guidance	Voluntary reporting system, state authorities scrutiny	Windshear Detection
702		wather forecast, pilot training, ATM guidance	Tower staff training	Windshear Management
703		Flight plan, weather forecast, weather radar, ATM guidance	State labor regulations, labor unions, ATM work organisation	Maintain Control
704		Aircraft maintenance checks, fail-safe design	State labor regulations, labor unions, ATM work organisation	
705			Staff training	
706			Requirements evaluation, multistage acceptance, voluntary reporting	



No.		Prevention (Detection/Recovery) to Occurrences (Uneventful Events)	Prevention (Detection/Recovery) to Deviations (Procedural/Flight Path)	CATS barriers
707			Requirements evaluation, multistage acceptance, voluntary reporting	
708			Pilot training, instruments information aid	
709			Multistage process acceptance, process update	
710			Multistage process acceptance, process update	
711			International and state regulations, norms, audits, certification and their updates	
712			Certification, market pressure, regulations update, CAA monitoring	
713			Certification of profuct and manufacturer, recipent test, reporting systems	
714			CAA monitoring, state regulations	
715			Air carrier organisation, state labour rgulations, labour unions	
801	ESD9	Tire maintenance, replacement, runway state monitoring	Voluntary reporting system, state authorities scrutiny	RTO (procedure)
802		runway state monitoring, airport safety program	Voluntary reporting system, CAA monitoring	Maintain Control (V <v1)< td=""></v1)<>
803		Runway state monitoring, Airport safety program	State labor regulations, labor unions, ATM work organisation	Maximum Braking (V <v1)< td=""></v1)<>
804		Airport wildlife deterrence program	Requirements evaluation, multistage acceptance, voluntary reporting	Maintain Control
805		Airport security program, active observation and deterrence of wildlife	Pilot training, tower guidance	Engine integrity
806		Aircraft maintenance checks, fail-safe design	Pilot training, tower guidance	
807			Pilot training, tower guidance	
808			Pilot training, system design, test, callibration	
809			Pilot training, software Q&A	
810			Pilot training, computerised control aid, monitoring by ATC	
811			Pilot training	
812			Multistage process acceptance, process update	
813			Multistage process acceptance, process update	
814			Certification, market pressure	
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No.		Prevention (Detection/Recovery) to Occurrences (Uneventful Events)	Prevention (Detection/Recovery) to Deviations (Procedural/Flight Path)	CATS barriers
815			Certification of product and menufacturer, market pressure, CAA monitoring, audits	
816			Certification of product and manufacturer, market pressure, CAA monitoring, audits	
817			CAA monitoring, voluntary reporting	
818			CAA monitoring, EU and state regulations, voluntary reporting	
819			CAA monitoring, certification, staff experience	
820			CAA monitoring, certification, staff experience	
821			CAA monitoring	
822			Air carrier organisation, state labour rgulations, labour unions	
901	ESD10	Tire maintenance, replacement, runway state monitoring	Voluntary reporting system, state authorities scrutiny	Pitch control
902		runway state monitoring, airport safety program	Voluntary reporting system, CAA monitoring	RTO (procedure)
903		Runway state monitoring, Airport safety program	State labor regulations, labor unions, ATM work organisation	Maximum Braking (V <v1)< td=""></v1)<>
904		Airport wildlife deterrence program	Staff training, tower guidance, cockpit design	Rotation
905		Airport security program, active observation and deterrence of wildlife	Staff training, ATC coopertation	
906		Aircraft maintenance checks, fail-safe design	Staff training	
907		Aircraft maintenance checks, fail-safe design	Staff training	
908			Requirements evaluation, multistage acceptance, voluntary reporting	
909			Pilot training, tower guidance	
910			Pilot training, tower guidance	
911			Pilot training, tower guidance	
912			Pilot training, tower guidance	
913			Pilot training, system design, test, callibration	
914			Pilot training, software Q&A	
915			Pilot training, computerised control aid, monitoring by ATC	
916			Pilot training	
917			Multistage process acceptance, process update	



No.		Prevention (Detection/Recovery) to Occurrences (Uneventful Events)	Prevention (Detection/Recovery) to Deviations (Procedural/Flight Path)	CATS barriers
918			Multistage process acceptance, process update	
919			Certification, market pressure	
920			Certification of product and menufacturer, market pressure, CAA monitoring, audits	
921			Certification of product and menufacturer, market pressure, CAA monitoring, audits	
922			CAA monitoring, voluntary reporting	
923			CAA monitoring, EU and state regulations, voluntary reporting	
924			CAA monitoring, certification, staff experience	
925			CAA monitoring, certification, staff experience	
926			CAA monitoring	
927			Air carrier organisation, state labour rgulations, labour unions	
1001	ESD11	Work organisation, state labor regulations, unions, labor audits/inspections	Voluntary reporting system, state authorities scrutiny	Flammability and ignition
1002		Volcano activity observation, Flight plan, ATM guidance	Voluntary reporting system, CAA monitoring	Onboard Detection & Extinction
1003		Runway state monitoring, TCAS, pilot training	State labor regulations, labor unions, ATM work organisation	Fire Containment
1004		Runway state monitoring, Airport safety program	Staff training, certification, audits	Maintain Control
1005		Manuals, state regulations, audits	Staff training	
1006		Ground crew training, checklists, procedures	Staff training	
1007		ATM guidance, radar, pilot training, procedures, transponder	Staff expertise, multistage process acceptance, process evaluation and update	
1008		Airport security program, active observation and deterrence of wildlife	Requirements evaluation, multistage acceptance, voluntary reporting	
1009		Aircraft maintenance checks, aircarft design, security, maintenance staff training,	Quality assurance (e.g. FMEA), reporting systems, process update	
1010			Pilot training, certified computerised enginge management	
1011			Multistage process acceptance, process update	
1012			Multistage process acceptance, process update	



No.	Prevention (Detection/Recovery) to Occurrences (Uneventful Events)	Prevention (Detection/Recovery) to Deviations (Procedural/Flight Path)	CATS barriers
1013		Multistage process acceptance, process update	
1014		Multistage process acceptance, process update	
1015		Multistage process acceptance, process update	
1016		Multistage process acceptance, process update	
1017		Multistage process acceptance, process update	
1018		Multistage process acceptance, process update	
1019		Multistage process acceptance, process update	
1020		Maintenance staff training, audits	
1021		International and state regulations, norms, audits, certification and their updates	
1022		Certification, tests, Quality assurance	
1023		Certification, regulations update	
1024		Certification, market pressure, regulations update, customer feedback	
1025		Certification of product and manufacturer, market pressure, CAA monitoring, audits	
1026		Certification of product and manufacturer, market pressure, CAA monitoring, audits	
1027		Certification of product and manufacturer, market pressure, CAA monitoring, audits	
1028		Certification of product and manufacturer, market pressure, CAA monitoring, audits	
1029		Certification of product and manufacturer, market pressure, CAA monitoring, audits	
1030		Certification of product and manufacturer, market pressure, CAA monitoring, audits	
1031		CAA monitoring, certification, staff experience	
1032		CAA monitoring, certification, staff experience	



No.		Prevention (Detection/Recovery) to Occurrences (Uneventful Events)	Prevention (Detection/Recovery) to Deviations (Procedural/Flight Path)	CATS barriers
1033			CAA monitoring, certification, staff experience	
1034			CAA monitoring, certification, staff experience	
1035			CAA monitoring, certification, staff experience	
1036			Aircraft certification, proper design, maintenance checks, maintenance certification	
1037			Air carrier organisation, state labour rgulations, labour unions	
1101	ESD12	Pilot training incl. IFR flights, ATM guidance, navigation aids, pilot training	Voluntary reporting system, state authorities scrutiny	Attitude Guidance
1102		Aircraft maintenance checks, fail-safe design	State labor regulations, labor unions, ATM work organisation	Visual Orientation
1103			Staff training	Autopilot control
1104			Staff training	Control Recovery
1105			Staff training	Attitude Monitoring
1106			Staff expertise, multistage process acceptance, process evaluation and update	
1107			Requirements evaluation, multistage acceptance, voluntary reporting	
1108			Pilot training, tower/ATM training	
1109			Pilot training, fool-proof design	
1110			Pilot training, fly-by-wire	
1111			Pilot training, fly-by-wire	
1112			Pilot training, control design, fly-by- wire/light	
1113			Pilot training, control design, fly-by- wire/light	
1114			Pilot training, control design, fly-by- wire/light	
1115			Pilot training	
1116			Multistage process acceptance, process update	
1117			Multistage process acceptance, process update	
1118			Certification, recipent tests, audits	
1119			Certification, market pressure, regulations update, customer feedback	
1120			Callibration, mainenance, pre-flight check.	



No.		Prevention (Detection/Recovery) to Occurrences (Uneventful Events)	Prevention (Detection/Recovery) to Deviations (Procedural/Flight Path)	CATS barriers
1121			CAA monitoring, state regulations	
1122			Air carrier organisation, state labour rgulations, labour unions	
1201	ESD13	Aircraft maintenance checks, fail-safe design	Voluntary reporting system, state authorities scrutiny	FCS Operation
1202		Aircraft maintenance checks, fail-safe design	State labor regulations, labor unions, ATM work organisation	Control Recovery
1203		Aircraft maintenance checks, aircarft design	Staff training	
1204			Staff training	
1205			Staff expertise, multistage process acceptance, process evaluation and update	
1206			Staff expertise, multistage process acceptance, process evaluation and update	
1207			Staff experience, safety culture, process evaluation and update	
1208			Staff experience, reporting system, process evaluation and update	
1209			Staff experience, reporting system, copmponent evaluation and check	
1210			Requirements evaluation, multistage acceptance, voluntary reporting	
1211			Pre-flight checks, Staff experience, reporting system, process evaluation and update	
1212			Pre-flight checks, Staff experience, reporting system, process evaluation and update	
1213			Pilot training, equipment design, manual	
1214			Pilot training, control design, fly-by- wire/light	
1215			Multistage process acceptance, process update	
1216			Multistage process acceptance, process update	
1217			Multistage process acceptance, process update	
1218			Multistage process acceptance, process update	
1219			Multistage process acceptance, process update	



No.		Prevention (Detection/Recovery) to Occurrences (Uneventful Events)	Prevention (Detection/Recovery) to Deviations (Procedural/Flight Path)	CATS barriers
1220			Multistage process acceptance, process update	
1221			Certification, Recipient test, reporting system	
1222			Certification, recipent tests, audits	
1223			Certification, recipent tests, audits	
1224			Certification, recipent test, audits	
1225			CAA monitoring, certification, staff experience	
1226			Air carrier organisation, state labour rgulations, labour unions	
1301	ESD14	Work organisation, state labor regulations, unions, labor audits/inspections	Voluntary reporting system, state authorities scrutiny	Maintain Control
1302		Pilot training incl. IFR flights, ATM guidance, navigation aids, pilot training	State labor regulations, labor unions, ATM work organisation	
1303		Pilot health monitoring	State labor regulations, labor unions, ATM work organisation	
1304		Manuals, state regulations, audits	Staff training, fool-proof design	
1305		Flight plan, weather forecast, weather radar, ATM guidance	Staff training	
1306		Airport wildlife deterrence program	Staff training	
1307		Aircraft maintenance checks, fail-safe design	Requirements evaluation, multistage acceptance, voluntary reporting	
1308		Aircraft maintenance checks, fail-safe design	Requirements evaluation, multistage acceptance, voluntary reporting	
1309		Aircraft maintenance checks, fail-safe design	Pilot traning, tower guidance, aircraft tracking	
1310		Aircraft maintenance checks, aircarft design, security, maintenance staff training,	Pilot training, monitoring by ATC	
1311			Pilot qulification tests, training programmes, certificates	
1312			Multistage process acceptance, process update	
1313			Multistage process acceptance, process update	
1314			Multistage process acceptance, process update	
1315			Maintenance certification, audits, CAA monitoring	
1316			Certification, market pressure, regulations update, customer feedback	



No.		Prevention (Detection/Recovery) to Occurrences (Uneventful Events)	Prevention (Detection/Recovery) to Deviations (Procedural/Flight Path)	CATS barriers
1317			Certification of product and menufacturer, market pressure, CAA monitoring, audits	
1318			Certification of product and manufacturer, market pressure, CAA monitoring, audits	
1319			CAA monitoring, certification, staff experience	
1320			CAA monitoring, certification, staff experience	
1321			CAA monitoring, certification, staff experience	
1322			CAA monitoring	
1323			ATC training	
1324			Air staff and ATM staff training	
1325			Air carrier organisation, state labour rgulations, labour unions	
1401	ESD15	Flight plan, weather forecast, weather radar, ATM guidance	Voluntary reporting system, state authorities scrutiny	Maintain Control
1402		Aircraft maintenance checks, fail-safe design	Staff training, tower guidance	Flight crew icing detection and response
1403			Staff training	Ice protection System integrity
1404			Staff training	
1405			Pilot training, tower ATM training	
1406			Pilot training, publications of accident reports	
1407			Pilot training, automation	
1408			Pilot training, automation	
1409			Multistage process acceptance, process update	
1410			Aircraft design, tests and certification	
1411			Air carrier organisation, state labour rgulations, labour unions	
1501	ESD16	Volcano activity observation, Flight plan, ATM guidance	Voluntary reporting system, state authorities scrutiny	Flight instruments integrity
1502		Flight plan, weather forecast, weather radar, ATM guidance	State labor regulations, labor unions, ATM work organisation	Maintain Control
1503		Airport wildlife deterrence program	Staff training, audits, CAA monitoring, state norms and regulations	
1504		Aircraft maintenance checks, fail-safe design	Staff training	
1505			Staff training	
1506			Requirements evaluation, multistage acceptance, voluntary reporting	
			Pilot training, tower ATM training	



No.		Prevention (Detection/Recovery) to Occurrences (Uneventful Events)	Prevention (Detection/Recovery) to Deviations (Procedural/Flight Path)	CATS barriers
1508			Pilot training, automation	
1509			Multistage process acceptance, process update	
1510			Aircraft design, tests and certification	
1511			Air carrier organisation, state labour rgulations, labour unions	
1601	ESD17	Weather forecast, flight plan, navigation aids, Tower guidance	Weather forecast organisational quality assurance, forecast requirements, reliable source of forecasts	Weather Avoidance
1602		Volcano activity observation, Flight plan, ATM guidance	Voluntary reporting system, state authorities scrutiny	Encounter Risk Mitigation
1603		Seat belts, pilot physical and health tests,	Voluntary reporting system, state authorities scrutiny	Maintain Control
1604		Seat belts, crew physical and health tests,	Voluntary reporting system, CAA monitoring	
1605		Runway state monitoring, Airport safety program	Stward(ess) checks, request. Legal responsibility	
1606		Pilot training, wather forecast, flight plan, ATM guidance, navigation aids	State labor regulations, labor unions, ATM work organisation	
1607		Pilot training, engine control system, engine design, engine maintenance	Staff training, reporting, norms, CAA monitoring	
1608		Flight plan, weather forecast, weather radar, ATM guidance	Staff training, reporting	
1609		Flight plan, weather forecast, weather radar, ATM guidance	Staff training, reporting	
1610		Flight plan, weather forecast, weather radar, ATM guidance	Staff training	
1611		Flight plan, weather forecast, weather radar, ATM guidance	Staff training	
1612		Daily fuel quality checks at FBO, tank markings, ground crew training	Staff training	
1613		Airport wildlife deterrence program	Staff training	
1614		Aircraft maintenance checks, fail-safe design	Software quality assurance, tests, user training	
1615		Aircraft maintenance checks, fail-safe design	Requirements evaluation, multistage acceptance, voluntary reporting	
1616		Aircraft maintenance checks, aircarft design	Pilot training, tower ATM training	
1617		Aircraft maintenance checks, aircarft design	Pilot training, publications of accident reports	
1618			Pilot training, fly-by-wire	
1619			Pilot training, control design, fly-by- wire/light	
1620			Pilot training, automation	



No.		Prevention (Detection/Recovery) to Occurrences (Uneventful Events)	Prevention (Detection/Recovery) to Deviations (Procedural/Flight Path)	CATS barriers
1621			Pilot training, aircraft control design	
1622			Pilot training	
1623			Multistage process acceptance, process update	
1624			International and state regulations, norms, audits, certification and their updates	
1625			CAA monitoring	
1626			Aircraft design, tests and certification	
1627			Air carrier organisation, state labour rgulations, labour unions	
1701	ESD18	Runway state monitoring, Airport safety program, weather forecast	Voluntary reporting system, state authorities scrutiny	Single Engine Integrity
1702		Pilot training, aircraft tracking by airport tower	State labor regulations, labor unions, ATM work organisation	Single Engine Response
1703		Pilot training, weather forecast, flight plan, ATM guidance, navigation aids	Staff training, certification	Dual Engine Integrity
1704		Pilot training, weather forecast, flight plan, ATM guidance, navigation aids	Staff training, certification	Total Power Loss Response
1705		Pilot training, weather forecast, flight plan, ATM guidance, navigation aids	Staff training, certification	Engine Operation
1706		Pilot training, ILS, Tower guidance, glideslope	Staff training	Single Engine Control Response
1707		Pilot training, ILS, Tower guidance, fail-safe design	Staff training	Total Power Loss Control Response
1708		Pilot training, engine control system, engine design, engine maintenance	Software quality assurance, tests, user training	Achieve Airport
1709		Pilot training	Requirements evaluation, multistage acceptance, voluntary reporting	
1710		Ground crew training, pilot inspection	Reporting system, procedure updates and evalutaion	
1711		Ground crew training, checklists, procedures	Pilot training, tower ATM training	
1712		Flight plan, weather forecast, weather radar, ATM guidance	Pilot training, system design, test, callibration	
1713		Avionics maintenance, design	Pilot training, software Q&A	
1714		Aircraft maintenance checks, fail-safe design	Pilot training, responsibility, tower guidance to limited extent	
1715		Aircraft maintenance checks, fail-safe design	Pilot training, responsibility, tower guidance	
1716		Aircraft maintenance checks, aircarft design	Pilot training, responsibility, tower guidance	
1717		Aircraft maintenance checks	Pilot training, qualification certification, cockpit design	



No.		Prevention (Detection/Recovery) to Occurrences (Uneventful Events)	Prevention (Detection/Recovery) to Deviations (Procedural/Flight Path)	CATS barriers
1718			Pilot training, publications of accident reports	
1719			Pilot training, fly-by-wire, information in cockpit for pilot	
1720			Pilot training, control design, fly-by- wire/light	
1721			Pilot training, control design	
1722			Pilot training, control design	
1723			Pilot training, control design	
1724			Pilot training, control design	
1725			Pilot training, aircraft control design	
1726			Pilot training, aircraft control design	
1727			Pilot training	
1728			Multistage process acceptance, process update	
1729			International and state regulations, norms, audits, certification and their updates	
1730			International and state regulations, norms, audits, certification and their updates	
1731			CAA monitoring, voluntary reporting	
1732			CAA monitoring, state regulations	
1733			CAA monitoring, EU and state regulations, voluntary reporting	
1734			CAA monitoring state norms and regulations.	
1735			Air carrier organisation, state labour rgulations, labour unions	
1801	ESD19	Weather forecast, flight plan, navigation aids, Tower guidance	Voluntary reporting system, state authorities scrutiny	Stable Approach
1802		Seat design, pilot physical tests	State labor regulations, labor unions, ATM work organisation	Missed approach
1803		Runway state monitoring, Airport safety program, weather forecast	Staff training, certification	Maintain control
1804		Pilot training, aircraft tracking by airport tower	Staff training	Structural integrity
1805		Pilot training, weather forecast, flight plan, ATM guidance, navigation aids	Staff training	Maximum braking
1806		Pilot training, ILS, Tower guidance, glideslope	Staff training	Fuel Management
1807		Pilot training, ILS, Tower guidance, fail-safe design	Software quality assurance, tests, user training	Stable Approach
1808		Pilot training, ILS, Tower guidance	Requirements evaluation, multistage acceptance, voluntary reporting	Missed approach



No.	Prevention (Detection/Recovery) to Occurrences (Uneventful Events)	Prevention (Detection/Recovery) to Deviations (Procedural/Flight Path)	CATS barriers
1809	Pilot training, aircraft design	Reporting system, procedure updates and evalutaion	Maintain control
1810	Pilot training incl. IFR flights, ATM guidance, navigation aids, pilot training	Pilot training, responsibility, tower guidance to limited extent	Structural integrity
1811	Pilot training	Pilot training, responsibility, tower guidance	Maximum braking
1812	Flight plan, weather forecast, weather radar, ATM guidance	Pilot training, qualification certification, cockpit design	Fuel Management
1813	Aircraft maintenance checks, fail-safe design	Pilot training, multiple information source	
1814	Aircraft maintenance checks	Pilot training, instrument panel aids	
1815		Pilot training, ILS, instrument panel aids	
1816		Pilot training, fool-proof design	
1817		Pilot training, fly-by-wire, information in cockpit for pilot	
1818		Pilot training, control design, fly-by- wire/light	
1819		Pilot training, control design	
1820		Pilot training, control design	
1821		Pilot training, control design	
1822		Pilot training, control design	
1823		Pilot training, ATC cooperation	
1824		Pilot training, aircraft control design	
1825		Pilot training and experience	
1826		Pilot training	
1827		National regulations update, CAA monitoring	
1828		Multistage process acceptance, process update	
1829		International and state regulations, norms, audits, certification and their updates	
1830		Certification, market pressure, regulations update, customer feedback	
1831		Certification of product and menufacturer, market pressure, CAA monitoring, audits	
1832		CAA monitoring, EU and state regulations, voluntary reporting	
1833		CAA monitoring, certification, staff experience	
		<u> </u>	l .



No.		Prevention (Detection/Recovery) to Occurrences (Uneventful Events)	Prevention (Detection/Recovery) to Deviations (Procedural/Flight Path)	CATS barriers
1834			CAA monitoring state norms and regulations.	
1835			Air carrier organisation, state labour rgulations, labour unions	
2001	ESD23	Weather monitoring, Tower guidance, pilot training	Voluntary reporting system, state authorities scrutiny	Windshear Detection
2002		wather forecast, pilot training, ATM guidance	Tower staff training	Windshear Management
2003		Tower guidance, wather forecast, pilot training	State labor regulations, labor unions, ATM work organisation	Structural Integrity
2004		Runway state monitoring, Airport safety program, weather forecast	State labor regulations, labor unions, ATM work organisation	Maintain control
2005		Pilot training, ILS, Tower guidance, glideslope	Staff training	Maximum braking
2006		Pilot training, ILS, Tower guidance, fail-safe design	Staff training	
2007		Pilot training, ILS, Tower guidance	Staff training	
2008		Pilot training, aircraft design	Requirements evaluation, multistage acceptance, voluntary reporting	
2009		Flight plan, weather forecast, weather radar, ATM guidance	Requirements evaluation, multistage acceptance, voluntary reporting	
2010		Aircraft maintenance checks, fail-safe design	Reporting system, procedure updates and evalutaion	
2011		Aircraft maintenance checks	Pilot training, responsibility, tower guidance	
2012			Pilot training, qualification certification, cockpit design	
2013			Pilot training, multiple information source	
2014			Pilot training, instrument panel aids	
2015			Pilot training, ILS, instrument panel aids	
2016			Pilot training, fly-by-wire, information in cockpit for pilot	
2017			Pilot training, control design	
2018			Pilot training, control design	
2019			Pilot training, control design	
2020			Pilot training, control design	
2021			Pilot training, ATC cooperation	
2022			Pilot training and experience	
2023			Multistage process acceptance, process update	
2024			Multistage process acceptance, process update	



No.		Prevention (Detection/Recovery) to Occurrences (Uneventful Events)	Prevention (Detection/Recovery) to Deviations (Procedural/Flight Path)	CATS barriers
2025			Multistage process acceptance, process update	
2026			International and state regulations, norms, audits, certification and their updates	
2027			Certification, market pressure, regulations update, CAA monitoring	
2028			Certification of profuct and manufacturer, recipent test, reporting systems	
2029			Certification of product and menufacturer, market pressure, CAA monitoring, audits	
2030			CAA monitoring, state regulations	
2031			CAA monitoring, EU and state regulations, voluntary reporting	
2032			CAA monitoring, certification, staff experience	
2033			ATC guidance, weather monitoring	
2034			Air carrier organisation, state labour rgulations, labour unions	
2101	ESD25	Weather monitoring, Tower guidance, pilot training	Voluntary reporting system, state authorities scrutiny	Flare handling
2102		Weather forecast, flight plan, navigation aids, Tower guidance	State labor regulations, labor unions, ATM work organisation	Structural Integrity
2103		Pilot training, aircraft tracking by airport tower	Staff training	Maintain Control
2104		Pilot training, ILS, Tower guidance, glideslope	Staff training	
2105		Pilot training, aircraft design	Requirements evaluation, multistage acceptance, voluntary reporting	
2106		Flight plan, weather forecast, weather radar, ATM guidance	Pilot training, responsibility, tower guidance	
2107			Pilot training, ILS, instrument panel aids	
2108			Pilot training, control design, fly-by- wire/light	
2109			Pilot training, ATC cooperation	
2110			Pilot training and experience	
2111			Pilot training	
2112			Multistage process acceptance, process update	
2113			Certification of product and menufacturer, market pressure, CAA monitoring, audits	



No.		Prevention (Detection/Recovery) to Occurrences (Uneventful Events)	Prevention (Detection/Recovery) to Deviations (Procedural/Flight Path)	CATS barriers
2114			CAA monitoring, certification, staff experience	
2115			ATC guidance, weather monitoring	
2116			Air carrier organisation, state labour rgulations, labour unions	
2201	ESD26	Weather monitoring, Tower guidance, pilot training	Voluntary reporting system, state authorities scrutiny	Landing roll handling
2202		Runway state monitoring, Airport safety program, weather forecast	State labor regulations, labor unions, ATM work organisation	Maintain control
2203		Pilot training, aircraft design	Staff training	Maximum braking
2204		Pilot training incl. IFR flights, ATM guidance, navigation aids, pilot training	Staff training	
2205		Flight plan, weather forecast, weather radar, ATM guidance	Staff training	
2206		Aircraft maintenance checks	Requirements evaluation, multistage acceptance, voluntary reporting	
2207			Reporting system, procedure updates and evalutaion	
2208			Pilot training, responsibility, tower guidance to limited extent	
2209			Pilot training, responsibility, tower guidance	
2210			Pilot training, qualification certification, cockpit design	
2211			Pilot training, ILS, instrument panel aids	
2212			Pilot training, control design	
2213			Pilot training, control design	
2214			Pilot training, control design	
2215			Pilot training, control design	
2216			Pilot training, computerised control aid	
2217			Pilot training, computerised control aid	
2218			Pilot training, ATC cooperation	
2219			Pilot training and experience	
2220			Pilot training	
2221			Pilot training	
2222			CAA monitoring, EU and state regulations, voluntary reporting	
2223			ATC cooperation, pilot training	
2224			Air carrier organisation, state labour rgulations, labour unions	



No.		Prevention (Detection/Recovery) to Occurrences (Uneventful Events)	Prevention (Detection/Recovery) to Deviations (Procedural/Flight Path)	CATS barriers
2301	ESD27	Work organisation, state labor regulations, unions, labor audits/inspections	Voluntary reporting system, state authorities scrutiny	Directional Control Systems Integrity
2302		Tire maintenance, replacement, runway state monitoring	Voluntary reporting system, CAA monitoring	Gear Integrity
2303		Runway state monitoring, Airport safety program	State labor regulations, labor unions, ATM work organisation	Wheel Integrity
2304		Manuals, state regulations, audits	Staff training	Maintain control
2305		Airport wildlife deterrence program	Requirements evaluation, multistage acceptance, voluntary reporting	
2306		Airport security program, active observation and deterrence of wildlife	Multistage process acceptance, process update	
2307		Aircraft maintenance checks, fail-safe design	Certification of product and menufacturer, market pressure, CAA monitoring, audits	
2308			CAA monitoring, certification, staff experience	
2309			CAA monitoring	
2310			Air carrier organisation, state labour rgulations, labour unions	
2701	ESD31	Weather forecast, Towe and ATM guidance	Voluntary reporting system, state authorities scrutiny	Conflict avoidance (Crew)
2702		TCAS equipment maintenance	Voluntary reporting system, state authorities scrutiny	Conflict avoidance (ATC)
2703		Pilot training, navigational aids, ATM guidance	Very high pressure to avoid financial and loss of pax godwill consequences	
2704		Pilot training incl. IFR flights, ATM guidance, navigation aids, pilot training	Tests, evaluation, update	
2705		Flight plan, weather forecast, weather radar, ATM guidance	State labor regulations, labor unions, work organisation, safety culture	
2706		Display maintenance, checks, design, pilot training	State labor regulations, labor unions, ATM work organisation	
2707		Communication Systems maintenance and design,	State labor regulations, labor unions, ATM work organisation	
2708		ATM guidance, radar, pilot training, procedures, transponder, air defence	Staff training, staff cooperation	
2709		ATM guidance, radar, pilot training, procedures, transponder	Staff training, fool-proof design	
2710		Aircraft maintenance checks, fail-safe design	Staff training, communication equipment reuirements, maintenance	
2711			Staff training and experience	
2712			Staff training	
2713			Staff training	
2714			Staff training	



No.	Prevention (Detection/Recovery) to Occurrences (Uneventful Events)	Prevention (Detection/Recovery) to Deviations (Procedural/Flight Path)	CATS barriers
2715		Staff training	
2716		Staff experience, reporting system, process evaluation and update	
2717		Staff experience, reporting system, process evaluation and update	
2718		Requirements evaluation, multistage acceptance, voluntary reporting	
2719		Requirements evaluation, multistage acceptance, voluntary reporting	
2720		Quality assurance (e.g. FMEA), customer feedback, market pressure	
2721		Pressure to get permissions for operations, market pressure	
2722		Piot training, aircarft tracking and ATM cooperation	
2723		Pilota and ATC training	
2724		Pilot training, staff training and cooperation	
2725		Pilot training, notification in instrument	
2726		Pilot training	
2727		Pilot qulification tests, training programmes, certificates	
2728		National regulations update, CAA monitoring	
2729		Multistage process acceptance, process update	
2730		Multistage process acceptance, process update	
2731		Multistage process acceptance, process update	
2732		Multistage process acceptance, process update	
2733		Multistage process acceptance, process update	
2734		Multistage process acceptance, process update	
2735		Multistage process acceptance, process update	
2736		Multiple information sources, GPS, nav beacons, ATM cooperation, pilot training	



No.		Prevention (Detection/Recovery) to Occurrences (Uneventful Events)	Prevention (Detection/Recovery) to Deviations (Procedural/Flight Path)	CATS barriers
2737			International agreements, government policies avoiding war, ATC airspace monitoring, civil cooperation with air force	
2738			Flight plan acceptance by authorities, AC airspace monitoring, transponers in GA aircraft	
2739			Consultations on design stage, evaluation and update	
2740			Certification, Recipient test, reporting system	
2741			Certification, market pressure, regulations update, CAA monitoring	
2742			Certification, market pressure, regulations update, CAA monitoring	
2743			Certification of product and manufacturer, market pressure, CAA monitoring, audits	
2744			Certification of product and manufacturer, market pressure, CAA monitoring, audits	
2745			Callibration, mainenance, pre-flight check.	
2746			CAA monitoring, certification, staff experience	
2747			CAA monitoring, certification, staff experience	
2748			Audits, periodic evaluation and update	
2749			ATC training	
2750			Altitude monitoring, various sorces of information for pilot and ATM	
2751			Airport tower airspace monitoring, transponders installed in GA aircraft	
2752			Aircraft tracking by ATM, transponders, navigation aids, pilot training	
2753			Air staff and ATM staff training	
2754			Air carrier organisation, state labour rgulations, labour unions	
2801	ESD32	Work organisation, state labor regulations, unions, labor audits/inspections	Voluntary reporting system, state authorities scrutiny	Compliance with airport traffic procedures
2802		Tower guidance, taxiway marking, pilot training	Voluntary reporting system, state authorities scrutiny	Runway conflict Avoidance (ATC)



No.	Prevention (Detection/Recovery) to Occurrences (Uneventful Events)	Prevention (Detection/Recovery) to Deviations (Procedural/Flight Path)	CATS barriers
2803	Pilot training, Tower guidance	Voluntary reporting system, state authorities scrutiny	Runway conflict avoidance (Crew)
2804	Pilot training, signs on the runway	Tower guidance, aircraft training, pilot training	
2805	Pilot training incl. IFR flights, ATM guidance, navigation aids, pilot training	State regulations, norms, audits, certification	
2806	Manuals, state regulations, audits	State labor regulations, labor unions, ATM work organisation	
2807	Aircraft maintenance, A, B, C, D-checks	State labor regulations, labor unions, ATM work organisation	
2808		Staff training, organisation audits, CAA monitoring	
2809		Staff training, communication equipment reuirements, maintenance	
2810		Staff training	
2811		Staff training	
2812		Staff training	
2813		Staff training	
2814		Requirements evaluation, multistage acceptance, voluntary reporting	
2815		Requirements evaluation, multistage acceptance, voluntary reporting	
2816		Process evaluation, multistage acceptance, voluntary reporting	
2817		Pilot traning, tower guidance, aircraft tracking	
2818		Pilot traning, tower guidance, aircraft tracking	
2819		Pilot traning, tower guidance, aircraft tracking	
2820		Pilot traning, tower guidance, aircraft tracking	
2821		Pilot traning, tower guidance, aircraft tracking	
2822		Pilot training, tower ATM training	
2823		Pilot training, pilot legal responsibility	
2824		Pilot training, pilot legal responsibility	
2825		Pilot training, legal responsibility, tower guidance	
2826		Pilot qulification tests, training programmes, certificates	
2827		Multistage process acceptance, process update	



No.		Prevention (Detection/Recovery) to Occurrences (Uneventful Events)	Prevention (Detection/Recovery) to Deviations (Procedural/Flight Path)	CATS barriers
2828			Multistage process acceptance, process update	
2829			International and state regulations, norms, audits, certification and their updates	
2830			International and state regulations, norms, audits, certification and their updates	
2831			EU level and state level requirements, airport safety programme	
2832			CAA monitoring	
2833			ATM training, pilot training	
2834			ATC training	
2835			Alphabet pronunciation standards, staff training, communication equipment standards	
2836			Air staff and ATM staff training	
2837			Air carrier organisation, state labour rgulations, labour unions	
3001	ESD35	Runway state monitoring	Voluntary reporting systems, CAA coperation with users	GPWS Warning
3002		Pilot training, ATM and tower guidance, flight plan, Navigation aids	Voluntary reporting system, state authorities scrutiny	Visual Warning
3003		Pilot training, ATM and tower guidance, flight plan, Navigation aids	State labor regulations, labor unions, ATM work organisation	ATC Warning
3004		Pilot training incl. IFR flights, ATM guidance, navigation aids, pilot training	State labor regulations, labor unions, ATM work organisation	On-board monitoring
3005		Maintenance staff training, database design, backups, database backlogs	Staff training, organisation culture, management monitoring	Trajectory command procedures
3006		ground installation maintenance	Staff training, communication equipment reuirements, maintenance	
3007		Equipment maintenance	Staff training, audits, CAA monitoring, state norms and regulations	
3008		Communication Systems maintenance and design,	Staff training	
3009		Aircraft maintenance checks, fail-safe design	Staff training	
3010		air carrier organisation, pilot training	Staff training	
3011			Staff training	
3012			Staff training	
3013			Requirements evaluation, multistage acceptance, voluntary reporting	
3014			Requirements evaluation, multistage acceptance, voluntary reporting	



No.	Prevention (Detection/Recovery) to Occurrences (Uneventful Events)	Prevention (Detection/Recovery) to Deviations (Procedural/Flight Path)	CATS barriers
3015		Reporting system, procedure updates and evalutaion	
3016		Process evaluation, multistage acceptance, voluntary reporting	
3017		Pilot training, routine	
3018		Pilot training, responsibility, tower guidance	
3019		Pilot training, fool-proof design	
3020		Pilot training, communication with Tower, aircraft tracking	
3021		Pilot training, communication with Tower, aircraft tracking	
3022		Pilot training	
3023		Pilot training	
3024		Pilot situational awarness, communication between pilot and ATM	
3025		Pilot qulification tests, training programmes, certificates	
3026		Pilot and other staff training, staff cooperation	
3027		National regulations update, CAA monitoring	
3028		Multistage process acceptance, process update	
3029		Multistage process acceptance, process update	
3030		Multistage process acceptance, process update	
3031		Multistage process acceptance, process update	
3032		Multistage process acceptance, process update	
3033		ILS, glideslope, Aircraft tracking, Tower guidabnce, pilot instruments, training	
3034		Certification, Recipient test, reporting system	
3035		Certification, market pressure, regulations update, customer feedback	
3036		Certification, market pressure, CAA monitoring, regulations update	
3037		Certification, market pressure, CAA monitoring, regulations update	



No.		Prevention (Detection/Recovery) to Occurrences (Uneventful Events)	Prevention (Detection/Recovery) to Deviations (Procedural/Flight Path)	CATS barriers
3038			Certification of product and manufacturer, market pressure, CAA monitoring, audits	
3039			Certification of product and manufacturer, market pressure, CAA monitoring, audits	
3040			Certification of product and manufacturer, market pressure, CAA monitoring, audits	
3041			Callibration, mainenance, pre-flight check.	
3042			CAA monitoring, state regulations	
3043			CAA monitoring, certification, staff experience	
3044			CAA monitoring, certification, staff experience	
3045			CAA monitoring, certification, staff experience	
3046			CAA monitoring, certification, staff experience	
3047			CAA monitoring	
3048			ATC training	
3049			Aircraft tracking, Tower guidabnce, pilot instruments, training	
3050			Aircraft tracking, ATM guidabnce, pilot instruments, training	
3051			Aircraft tracking, ATM guidabnce, pilot instruments, training	
3052			Air staff and ATM staff training	
3053			Air carrier organisation, state labour rgulations, labour unions	
3101	ESD36	Work organisation, state labor regulations, unions, labor audits/inspections	Voluntary reporting system, state authorities scrutiny	Compliance with airport traffic procedures
3102		Tower guidance, taxiway marking, pilot training	Tower guidance, aircraft training, pilot traning	Taxiway or apron conflict avoidance (ATC)
3103		Tower guidance, aircraft training, pilot training	State labor regulations, labor unions, ATM work organisation	Taxiway or apron conflict avoidance (Crew)
3104		Tower guidance, aircraft training, pilot traning	State labor regulations, labor unions, ATM work organisation	
3105		Tower guidance, aircraft training, pilot training	Staff training, communication equipment reuirements, maintenance	
3106		POA certificate, quality checks at factory and customer level	Staff training	



No.	Prevention (Detection/Recovery) to Occurrences (Uneventful Events)	Prevention (Detection/Recovery) to Deviations (Procedural/Flight Path)	CATS barriers
3107	Pilot training incl. IFR flights, ATM guidance, navigation aids, pilot training	Staff training	
3108	Manuals, state regulations, audits	Requirements evaluation, multistage acceptance, voluntary reporting	
3109	Maintenance operation organisation, audits, staff training	Requirements evaluation, multistage acceptance, voluntary reporting	
3110	Airport security	Pilot traning, tower guidance, aircraft tracking	
3111		Pilot traning, tower guidance, aircraft tracking	
3112		Pilot traning, tower guidance, aircraft tracking	
3113		Pilot traning, tower guidance, aircraft tracking	
3114		Pilot traning, tower guidance, aircraft tracking	
3115		Pilot traning, tower guidance, aircraft tracking	
3116		Pilot training, tower ATM training	
3117		Pilot training, fly-by-wire/light	
3118		Pilot qulification tests, training programmes, certificates	
3119		Multistage process acceptance, process update	
3120		Multistage process acceptance, process update	
3121		CAA monitoring	
3122		ATC training	
3123		Air staff and ATM staff training	
3124		Air carrier organisation, state labour rgulations, labour unions	



Step 6 - Link between precursors and CATS base events of safety barrier fault trees

Please refer to the following files:

Appendix B Step 6 – CFIT.pdf (ESD: 35)

Appendix B Step 6 – GCOL.pdf (ESD: 32, 36)

Appendix B Step 6 – LOC-I.pdf (ESD: 5, 6, 8, 11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 33, 38)

Appendix B Step 6 – MAC.pdf (ESD: 31)

Appendix B Step 6 – RELand.pdf (ESD: 19, 23, 25, 26, 27)

Appendix B Step 6 – RETO.pdf (ESD: 1, 2, 3, 4, 5, 9, 10)

Step 7 - Link between CATS base events of safety barrier fault trees and safety performance indicators

Please refer to the following files:

Appendix B Step 7 – CFIT.pdf (ESD: 35)

Appendix B Step 7 – GCOL.pdf (ESD: 32, 36)

Appendix B Step 7 – LOC-I.pdf (ESD: 5, 6, 8, 11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 33, 38)

Appendix B Step 7 – MAC.pdf (ESD: 31)

Appendix B Step 7 – RELand.pdf (ESD: 19, 23, 25, 26, 27)

Appendix B Step 7 – RETO.pdf (ESD: 1, 2, 3, 4, 5, 9, 10)

Step 8 - Link between precursors and safety performance indicators

Please refer to the following files:

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Appendix B Step 8 – CFIT.pdf (ESD: 35)

Appendix B Step 8 – GCOL.pdf (ESD: 32, 36)

Appendix B Step 8 – LOC-I.pdf (ESD: 5, 6, 8, 11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 33, 38)

Appendix B Step 8 – MAC.pdf (ESD: 31)

Appendix B Step 8 – RELand.pdf (ESD: 19, 23, 25, 26, 27)

Appendix B Step 8 – RETO.pdf (ESD: 1, 2, 3, 4, 5, 9, 10)
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	Base events	Code	Definition	Identifiable precursors	No.
D 35	Base events	Code	Definition	Identifiable precursors	No.
	Flight crew decision error /operation of equipment error			Flight crew decision error /operation of equipment error	
		AL35F5211	Given a manual trajectory command during approach, an incorrect trajectory command (ITC) is executed due to ground navigational aid failure. This comprises ILS and navigational beacon failures not recognised by flight crew. It includes failures of NOTAM information to warn the flight crew about navaid problems.	Ground Navigational Aid failure	62
				Inadequate NOTAM information concerning ground navigational aid failure	68
				Traffic controller tiredness - Inadequate workload distribution	137
					145
				Flaws in maintenance technician / airworthiness specialist requirements definition	149
				process and/or training methodology	143
					150
				Not recognized ground Navaids System failure not reflected in NOTAM messages	308
				Flaws in aircraft system maintenance process definition - Ground navigational systems	488
				of the system / product compliance with requirements - Ground navigational systems	489
				and components (e.g. ILS)	
					490
		AL35F5212	Given a manual trajectory command during approach, an ITC is executed due to on-board navigational equipment failure. This comprises failures in the navigational receivers not recognised by flight crew. It may include lack of awareness of equipment failure modes.	System failure affecting the operation of primary instruments / displays or standby instruments	26
					149
				Maintenance technician / airworthiness specialist tiredness - Inadequate workload	15-
				distribution	150
					151
					167
				Flaws in pilot requirements definition process and/or training methodology	168
				Lack of adherence to the SOP in terms of critical indicators cross-checking	224
					303
				systems and components	491
				of the system / product compliance with requirements - Onboard navigational	492
				Flaws in manufacturer quality control process - Onboard navigational systems and	493
	Inadequate charts cause ITC	AL35F5213	Given a manual trajectory command during approach, an ITC is executed due to inadequate charts. This comprises ITC primarily caused by inadequacies in the approach procedures or on-board navigational charts.	Inadequate navigational chart	69
			· ·	Pilot tiredness - Inadequate workload distribution	167
				Flaws in pilot requirements definition process and/or training methodology	168
	Incorrect ATC clearance causes ITC	AL35F5214	Given a manual trajectory command during approach, ITC is executed due to incorrect ATC clearances. This only covers cases where incorrect clearances directly cause the pilot to command	Flaws in aircraft system maintenance process definition - stickshaker	245 136
			Tilgnt towards terrain.	Flaws in traffic controller requirements definition process and/or training methodology	145
				Lack of adherence to SOP for AIR operations in terms of controller error in approach clearence instruction	307
	Data interpretation by pilot causes ITC	AL35F522	Given a manual trajectory command during approach by a pilot in possession of the necessary data, of ITC due to incorrect interpretation of the data. This covers incorrect interpretation of navaids and ATC clearances.	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
				Pilot tiredness - Inadequate workload distribution	167 168
					245
	Misjudgement by pilot causes ITC	AL35F523	Given a manual trajectory command during approach by a pilot having understood the necessary data, ITC is executed due to misjudgement of terrain separation.	Adverse weather / poor visibility conditions / darkness	6
				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151
				or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution	167
				Flaws in pilot requirements definition process and/or training methodology	168
			1	Lack of adherence to SARPs included in Annex 14 and related documents in terms of	
				RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).	225
	Violation of procedures by pilot causes	AL35F524	Given a manual trajectory command during approach by a pilot having understood the necessary data, an ITC is executed due to	locations (e.g. mountains). Altimeter setting error	225 274 167
	Violation of procedures by pilot causes ITC	AL35F524	Given a manual trajectory command during approach by a pilot having understood the necessary data, an ITC is executed due to deliberate violation of terrain separation standards.	locations (e.g. mountains). Altimeter setting error Pilot tiredness - Inadequate workload distribution	274 167
		AL35F524	having understood the necessary data, an ITC is executed due to	locations (e.g. mountains). Altimeter setting error Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	274 167 168
	ITC		having understood the necessary data, an ITC is executed due to deliberate violation of terrain separation standards.	locations (e.g. mountains). Altimeter setting error Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing	274 167 168 245
		AL35F524 AL35F53	having understood the necessary data, an ITC is executed due to	locations (e.g. mountains). Altimeter setting error Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	274 167 168
		Ground navaid failure causes ITC On-board nav equipment failure causes ITC Inadequate charts cause ITC Incorrect ATC clearance causes ITC Data interpretation by pilot causes ITC	Ground navaid failure causes ITC AL35F5211 On-board nav equipment failure causes ITC AL35F5212 Inadequate charts cause ITC AL35F5213 Incorrect ATC clearance causes ITC AL35F5214 Data interpretation by pilot causes ITC AL35F522	Given a manual trajectory command during approach, an incorrect trajectory command (III) is executed due to ground navagational actor failures not recognised by flight crew. It includes failures of NOTAM information to warn the flight crew about naval problems. On-board nav equipment failure causes ITC On-board nav equipment failure causes ITC AL36F5212 Given a manual trajectory command during approach, an ITC is executed due to on-board navigational equipment failure. This comprises failures in the navigational receivers not recognised by flight crew. It may include lack of awareness of equipment failure modes. Given a manual trajectory command during approach, an ITC is executed due to on-board navigational receivers not recognised by flight crew. It may include lack of awareness of equipment failure modes. Given a manual trajectory command during approach, an ITC is executed due to inadequate that This comprises ITC primarily caused by madequactes in the approach procedures or on-board navigational charts. Given a manual trajectory command during approach, an ITC is executed due to incorrect ATC clearance. This only comprises ITC primarily caused by madequactes in the approach procedures or on-board navigational charts. Given a manual trajectory command during approach, an ITC is executed due to incorrect ATC clearance. This only covers cases where incorrect clearances directly cause the pilot to command flight towards terrain. Given a manual trajectory command during approach by a pilot in possession of the necessary data, of ITC due to incorrect interpretation of navadis and ATC clearances.	Ground revoid failure causes ITC A 157311 A



		Base events	Code	Definition	Identifiable precursors	No.
1	9	Ground navaid failure causes ITC	AL35F6211	Given an FMS trajectory command during approach, an ITC is executed due to ground navigational aid failure. This comprises ILS and navigational beacon failures not recognised by flight crew or FMS. It includes failures of NOTAM information to warn the flight crew about navaid problems.	Ground Navigational Aid failure	62
2					Inadequate NOTAM information concerning ground navigational aid failure	68 137
					Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training	
4					methodology	145
5					Flaws in maintenance technician / airworthiness specialist requirements definition	149
-					process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	\vdash
6					distribution	150
7					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
8					Pilot tiredness - Inadequate workload distribution	167
9					Flaws in pilot requirements definition process and/or training methodology	168
10					Failure to check navigation accuracy before approach Inadequate certification process and / or flaws in methodology concerning verification	275
11					of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299
					Not recognized ground Navaids System failure not reflected in NOTAM messages Flaws in aircraft system maintenance process definition - Ground navigational systems	308
13					and components (e.g. ILS)	488
14					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS)	
15					Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS)	490
1	10	On-board nav equipment failure causes ITC	AL35F6212	Given an FMS trajectory command during approach, an ITC is executed due to on-board navigational equipment failure. This comprises failures in the navigational receivers not recognised by flight crew or FMS. It may include lack of awareness of equipment failure modes.	System failure affecting the operation of primary instruments / displays or standby instruments	26
2					Flaws in maintenance technician / airworthiness specialist requirements definition	149
H					process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	\vdash
3					distribution	150
4					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
5					Pilot tiredness - Inadequate workload distribution	167
6					Flaws in pilot requirements definition process and/or training methodology	168
7					Lack of adherence to the SOP in terms of critical indicators cross-checking Failure to check navigation accuracy before approach	224 275
					Inadequate certification process and / or flaws in methodology concerning verification	
9					of the system / product compliance with requirements - FMS subsystems and	299
-					components (autopilot incl.) Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting	\vdash
10					systems warning. Navigational aid failure.	303
11					Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491
12					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492
13					Flaws in manufacturer quality control process - Onboard navigational systems and	493
13					components.	493
1	11	False ILS capture causes ITC	AL35F6213	Given an FMS trajectory command during approach, an ITC is executed due to false ILS capture.	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
2					Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
3					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS)	
1	12	FMS nav database error causes ITC	AL35F6214	Given an FMS trajectory command during approach, an ITC is	Error in preparation of database for FMS	61
-				executed due to FMS database error.	Flaws in maintenance technician / airworthiness specialist requirements definition	
2					process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	149
3					distribution	150
1	13	FMS fault causes ITC	AL35F622	Given an FMS trajectory command during approach, an ITC is executed due to FMS hardware or software fault.	System failure affecting the operation of primary instruments / displays or standby instruments	26
2					Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
3					Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
4					distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299
5					Flaws in manufacturer quality control process - FMS subsystem and components	306
6					[autopilot incl.) Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)	410
1	14	FMS input error by flight crew causes ITC	AL35F623	Given an FMS trajectory command during approach, an ITC is executed due to flight crew error in entering commands into the FMS.	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
2					Pilot tiredness - Inadequate workload distribution	167
4					Flaws in pilot requirements definition process and/or training methodology Incorrect use of automation - FMS	168 269
5					Unintuitive and / or error prone system manual - FMS	494
	15	Minus of PAGE 1 (0) 1 :	AL DEFECT	Given an FMS trajectory command during approach, an ITC is		15-
1	15	Misuse of FMS by flight crew causes ITC	AL35Fb24	executed due to flight crew trying to make the FMS perform manoeuvres it is not intended to.	Pilot tiredness - Inadequate workload distribution	167



		Base events	Code	Definition	Identifiable precursors	No.
2					Flaws in pilot requirements definition process and/or training methodology	168
3 4					Lack of adherence to SOP in terms of approach and landing Incorrect use of automation - FMS	245 269
		Incorrect trajectory conflicts with		Given an ITC is executed by FMS, the trajectory is in conflict with		-
1	16	terrain	AL35F63	terrain	Adverse weather / poor visibility conditions / darkness	6
2					GPWS / TAWS alert / warning (genuine or spurious)	50
3		Inadequate trajectory command (ITC)		Given an ATC trajectory command during approach, an ITC is	MSAW warning	51
1	17	by ATCO	AL35F721	executed due to errors by the ATCO.	Traffic controller tiredness - Inadequate workload distribution	137
2					Flaws in traffic controller requirements definition process and/or training	145
					methodology	
3				Given an ATC trajectory command during approach, an ITC is	Current airport diagram not reflecting critical changes	155
1	18	Inadequate communication with pilot	AL35F722	executed due to inadequate communication between the ATCO and flight crew.	Prolonged loss of communications (PLOC) between pilot and controller(s)	53
2					Lack of English proficiency	132
3					Incorrect or confusing / misleading ATC instructions	133
4 5					Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution	134 137
					Flaws in traffic controller requirements definition process and/or training	
6					methodology	145
7					Lack of or poor communication quality	146
8					Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	148
9					Pilot tiredness - Inadequate workload distribution	167
10					Flaws in pilot requirements definition process and/or training methodology	168
				Given an ATC trajectory command during approach, an ITC is	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	
1	19	Inadequate pilot response to ATC	AL35F723	executed due to the flight crew not complying with ATC instructions despite giving a correct readback.	or / and passive contribution to the PF duties	151
2					Pilot tiredness - Inadequate workload distribution	167
3			 		Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing	168 245
		Incorrect trajectory conflicts with		Given an ITC is executed by ATC, the trajectory is in conflict with		
1	20	terrain	AL35F73	terrain	Adverse weather / poor visibility conditions / darkness	6
2					GPWS / TAWS alert / warning (genuine or spurious)	50
3 II +					MSAW warning	51
1	II	Flight crew CRM failure			Flight crew CRM failure	
1	21	Lack of fitness of PNF	AL35B4111	Given a flight towards terrain being commanded (FTTC), pilot not	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151
2				flying (PNF) fails to detect it due to lack of fitness (e.g. fatigue).	or / and passive contribution to the PF duties	167
3					Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	168
4					Flaws in CRM training procedures	263
5					Lack of adherence to the main CRM rules	264
6					Adverse weather / poor visibility conditions / darkness	6
7					System failure affecting the operation of primary instruments / displays or standby	26
8					instruments GPWS / TAWS alert / warning (genuine or spurious)	50
9					MSAW warning	51
10					Prolonged loss of communications (PLOC) between pilot and controller(s)	53
11					Error in preparation of database for FMS	61
12 13					Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure	62 68
14					Inadequate navigational chart	69
15					Lack of English proficiency	132
16					Lack of adherence to SOP during aircraft storage and / or maintenance in terms of	233
17					protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller	134
18					Traffic controller tiredness - Inadequate workload distribution	137
19					Flaws in traffic controller requirements definition process and/or training	
					methodology	145
20					Lack of or poor communication quality	146
21					Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	148
22					Flaws in maintenance technician / airworthiness specialist requirements definition	140
22					process and/or training methodology	149
23					Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150
-					distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	
24	L		<u>L_</u>		or / and passive contribution to the PF duties	151
25					Current airport diagram not reflecting critical changes	155
26					Pilot tiredness - Inadequate workload distribution	167
27 28					Flaws in pilot requirements definition process and/or training methodology Lack of adherence to the SOP in terms of critical indicators cross-checking	168 224
_0					Lack of adherence to the SOP in terms of critical indicators cross-criecking	
29					RWY parameters and location, attitude, approach path parameters and obstacles	225
30					locations (e.g. mountains).	24-
ĸП					Lack of adherence to SOP in terms of approach and landing Incorrect use of automation - FMS	245 269
		-			Altimeter setting error	274
32 33						275
32					Failure to check navigation accuracy before approach	2/3
32 33 34					Inadequate certification process and / or flaws in methodology concerning verification	
32 33					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and	299
32 33 34 35					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299
32 33 34					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and	
32 33 34 35					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. Navigational aid failure. Flaws in manufacturer quality control process - FMS subsystem and components	299 303
32 33 34 35					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopiloit incl.) Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. Navigational aid failure. Flaws in manufacturer quality control process - FMS subsystem and components (autopiloi incl.)	299 303 306
32 33 34 35					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. Navigational aid failure. Flaws in manufacturer quality control process - FMS subsystem and components	299 303



		Base events	Code	Definition	Identifiable precursors	No.
40					Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)	410
41					Flaws in aircraft system maintenance process definition - Ground navigational systems	s 488
41					and components (e.g. ILS) Inadequate certification process and / or flaws in methodology concerning verification	
42					of the system / product compliance with requirements - Ground navigational systems	
					and components (e.g. ILS) Flaws in manufacturer quality control process - Ground navigational systems and	+
43					components (e.g. ILS)	490
44					Flaws in aircraft system maintenance process definition - Onboard navigational	491
Н					systems and components Inadequate certification process and / or flaws in methodology concerning verification	n
45					of the system / product compliance with requirements - Onboard navigational systems and components.	492
46					Flaws in manufacturer quality control process - Onboard navigational systems and	493
47					components.	493
1	22	Distraction of PNF by unplanned events	AL 25 D 44 4 2	Given an FTTC, PNF fails to detect it due to distraction by	Unintuitive and / or error prone system manual - FMS Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	_
	22	Distraction of PNF by unplanned events	AL35B4112	unplanned events (e.g. unrelated warning messages).	or / and passive contribution to the PF duties	
3					Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168
4					Flaws in CRM training procedures	263
5 6					Lack of adherence to the main CRM rules Adverse weather / poor visibility conditions / darkness	264 6
7					System failure affecting the operation of primary instruments / displays or standby	26
8					instruments GPWS / TAWS alert / warning (genuine or spurious)	50
9					MSAW warning	51
10 11					Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS	53 61
12					Ground Navigational Aid failure	62
13					Inadequate NOTAM information concerning ground navigational aid failure	68
14 15					Inadequate navigational chart Lack of English proficiency	69 132
16					Lack of adherence to SOP during aircraft storage and / or maintenance in terms of	233
17					protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller	134
18					Traffic controller tiredness - Inadequate workload distribution	137
19					Flaws in traffic controller requirements definition process and/or training methodology	145
20					Lack of or poor communication quality	146
21					Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	148
-					driver Flaws in maintenance technician / airworthiness specialist requirements definition	1.00
22					process and/or training methodology	149
23					Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
24					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151
25					or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes	155
26					Pilot tiredness - Inadequate workload distribution	167
27 28					Flaws in pilot requirements definition process and/or training methodology Lack of adherence to the SOP in terms of critical indicators cross-checking	168 224
20					Lack of adherence to the 30r in terms of critical mutcators cross-criecking Lack of adherence to SARPs included in Annex 14 and related documents in terms of	224
29					RWY parameters and location, attitude, approach path parameters and obstacles	225
30					locations (e.g. mountains). Lack of adherence to SOP in terms of approach and landing	245
32					Incorrect use of automation - FMS	269
33 34					Altimeter setting error Failure to check navigation accuracy before approach	274 275
					Inadequate certification process and / or flaws in methodology concerning verification	n
35					of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299
36					Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting	303
Н					systems warning. Navigational aid failure. Flaws in manufacturer quality control process - FMS subsystem and components	+
37					(autopilot incl.)	306
38					Lack of adherence to SOP for AIR operations in terms of controller error in approach clearence instruction	307
39				<u> </u>	Not recognized ground Navaids System failure not reflected in NOTAM messages	308
40					Flaws in aircraft system maintenance process definition - FMS subsystems and	410
Н					components (autopilot incl.) Flaws in aircraft system maintenance process definition - Ground navigational systems	
41					and components (e.g. ILS)	488
42					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground navigational systems	
Ц					and components (e.g. ILS)	Ĺ
43					Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS)	490
44					Flaws in aircraft system maintenance process definition - Onboard navigational	491
Ë					systems and components Inadequate certification process and / or flaws in methodology concerning verification	
45					of the system / product compliance with requirements - Onboard navigational	492
Н					systems and components.	+
46					Flaws in manufacturer quality control process - Onboard navigational systems and components.	493
47					Unintuitive and / or error prone system manual - FMS	494
	23	Absorption of PNF in routine tasks	AL35B4113	Given an FTTC, PNF fails to detect it due to being absorbed in	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151
1	23			routine duties (e.g. radio communication).	or / and passive contribution to the PF duties	
2	23			routine duties (e.g. radio communication).	or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168



		Base events	Code	Definition	Identifiable precursors	No.
5					Flaws in CRM training procedures	263
6 7					Lack of adherence to the main CRM rules	264
\vdash					Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby	6
8					instruments	26
9					GPWS / TAWS alert / warning (genuine or spurious)	50
10					MSAW warning	51
11					Prolonged loss of communications (PLOC) between pilot and controller(s)	53
12 13					Error in preparation of database for FMS Ground Navigational Aid failure	61 62
14					Inadequate NOTAM information concerning ground navigational aid failure	68
15					Inadequate navigational chart	69
16					Lack of English proficiency	132
17					Lack of adherence to SOP during aircraft storage and / or maintenance in terms of	233
18					protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller	134
19					Traffic controller tiredness - Inadequate workload distribution	137
20					Flaws in traffic controller requirements definition process and/or training	145
ш					methodology	
21					Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	146
22					driver	148
23					Flaws in maintenance technician / airworthiness specialist requirements definition	149
23					process and/or training methodology	149
24					Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
H					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	1
25					or / and passive contribution to the PF duties	151
26					Current airport diagram not reflecting critical changes	155
27					Pilot tiredness - Inadequate workload distribution	167
28 29					Flaws in pilot requirements definition process and/or training methodology Lack of adherence to the SOP in terms of critical indicators cross-checking	168 224
-5					Lack of adherence to the SOP in terms of critical indicators cross-criecking	-24
30					RWY parameters and location, attitude, approach path parameters and obstacles	225
Ш					locations (e.g. mountains).	
31					Lack of adherence to SOP in terms of approach and landing	245
33 34					Incorrect use of automation - FMS Altimeter setting error	269 274
35					Failure to check navigation accuracy before approach	275
П					Inadequate certification process and / or flaws in methodology concerning verification	_
36					of the system / product compliance with requirements - FMS subsystems and	299
Ш					components (autopilot incl.)	_
37					Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. Navigational aid failure.	303
H					Flaws in manufacturer quality control process - FMS subsystem and components	+
38					(autopilot incl.)	306
39					Lack of adherence to SOP for AIR operations in terms of controller error in approach	307
40					clearence instruction Not recognized ground Navaids System failure not reflected in NOTAM messages	308
П					Flaws in aircraft system maintenance process definition - FMS subsystems and	
41					components (autopilot incl.)	410
42					Flaws in aircraft system maintenance process definition - Ground navigational systems	488
Н					and components (e.g. ILS) Inadequate certification process and / or flaws in methodology concerning verification	
43					of the system / product compliance with requirements - Ground navigational systems	
					and components (e.g. ILS)	1.00
44					Flaws in manufacturer quality control process - Ground navigational systems and	490
Н					components (e.g. ILS)	100
45					Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491
П					Inadequate certification process and / or flaws in methodology concerning verification	,
46					of the system / product compliance with requirements - Onboard navigational	492
Н					systems and components.	-
47					Flaws in manufacturer quality control process - Onboard navigational systems and components.	493
48					Unintuitive and / or error prone system manual - FMS	494
				Given an FTTC, PNF fails to detect it due to being directly instructed	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	
1	24	PF under instruction by PNF	AL35B4121	by the pilot flying (PF), and hence not performing independent	or / and passive contribution to the PF duties	151
2				monitoring.	Pilot tiredness - Inadequate workload distribution	167
3					Flaws in pilot requirements definition process and/or training methodology	168
4					Lack of adherence to SOP in terms of approach and landing	245
5					Flaws in CRM training procedures	263
6 7					Lack of adherence to the main CRM rules	264
П					Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby	6
8					instruments	26
9					GPWS / TAWS alert / warning (genuine or spurious)	50
10		<u> </u>			MSAW warning	51
11					Prolonged loss of communications (PLOC) between pilot and controller(s)	53
12 13					Error in preparation of database for FMS Ground Navigational Aid failure	61 62
14					Inadequate NOTAM information concerning ground navigational aid failure	68
15					Inadequate navigational chart	69
16					Lack of English proficiency	132
17					Lack of adherence to SOP during aircraft storage and / or maintenance in terms of	233
18					protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller	134
19					Traffic controller tiredness - Inadequate workload distribution	137
\rightarrow					Flaws in traffic controller requirements definition process and/or training	145
20						
20 21					methodology Lack of or poor communication quality	146



		Base events	Code	Definition	Identifiable precursors	No.
22					Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	148
23					Flaws in maintenance technician / airworthiness specialist requirements definition	149
Н					process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	\vdash
24					distribution	150
25					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
26					Current airport diagram not reflecting critical changes	155
27 28					Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168
29					Lack of adherence to the SOP in terms of critical indicators cross-checking	224
30					Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles	225
Ш					locations (e.g. mountains).	
31 33					Lack of adherence to SOP in terms of approach and landing Incorrect use of automation - FMS	245 269
34					Altimeter setting error	274
35					Failure to check navigation accuracy before approach Inadequate certification process and / or flaws in methodology concerning verification	275
36					of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299
37					Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting	303
38					systems warning. Navigational aid failure. Flaws in manufacturer quality control process - FMS subsystem and components	306
36					(autopilot incl.) Lack of adherence to SOP for AIR operations in terms of controller error in approach	-
39					clearence instruction	307
40					Not recognized ground Navaids System failure not reflected in NOTAM messages	308
41					Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)	410
42	_				Flaws in aircraft system maintenance process definition - Ground navigational systems	488
H					and components (e.g. ILS) Inadequate certification process and / or flaws in methodology concerning verification	1
43					of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS)	
44					Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS)	490
45					Flaws in aircraft system maintenance process definition - Onboard navigational	491
H					systems and components Inadequate certification process and / or flaws in methodology concerning verification	
46					of the system / product compliance with requirements - Onboard navigational systems and components.	492
47					Flaws in manufacturer quality control process - Onboard navigational systems and components.	493
48					Unintuitive and / or error prone system manual - FMS	494
1	25	Flight crew jointly operating FMS	AL35B4122	Given an FTTC, PNF fails to detect it due to jointly programming the flight management system (FMS) with the PF, and hence not	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
2				performing independent monitoring.		
3				performing independent monitoring.	Pilot tiredness - Inadequate workload distribution	167
4				performing independent monitoring.	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168 245
5				performing independent monitoring.	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures	168 245 263
-				performing independent monitoring.	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules	168 245
5				performing independent monitoring.	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby	168 245 263 264 6
5 6 7				performing independent monitoring.	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby Instruments	168 245 263 264 6 26
5 6 7 8 9				performing independent monitoring.	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning	168 245 263 264 6 26 50
5 6 7 8 9 10 11				performing independent monitoring.	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s)	168 245 263 264 6 26 50 51
5 6 7 8 9				performing independent monitoring.	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning	168 245 263 264 6 26 50
5 6 7 8 9 10 11 12 13 14				performing independent monitoring.	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in RM training procedures Lack of adherence to the main CRM rules Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure	168 245 263 264 6 26 50 51 53 61 62 68
5 6 7 8 9 10 11 12 13				performing independent monitoring.	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency	168 245 263 264 6 26 50 51 53 61 62
5 6 7 8 9 10 11 12 13 14 15				performing independent monitoring.	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in RM training procedures Lack of adherence to the main CRM rules Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of	245 263 264 6 26 50 51 53 61 62 68 69
5 6 7 8 9 10 11 12 13 14 15 16 17				performing independent monitoring.	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller	168 245 263 264 6 26 50 51 53 61 62 68 69 132 233
5 6 7 8 9 10 11 12 13 14 15 16 17				performing independent monitoring.	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in RM training procedures Lack of adherence to the main CRM rules Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller	168 245 263 264 6 50 51 53 61 62 68 69 132 233
5 6 7 8 9 10 11 12 13 14 15 16 17 18				performing independent monitoring.	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology	168 245 263 264 6 50 51 53 61 62 68 69 132 233 134 145
5 6 7 8 8 9 10 11 12 13 14 15 16 17 18 19 20				performing independent monitoring.	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in RM training procedures Lack of adherence to the main CRM rules Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of op poor communication quality	168 245 263 264 6 50 51 53 61 62 68 69 132 233 134 137 145
5 6 7 8 8 9 10 11 12 13 14 15 16 17 18 19				performing independent monitoring.	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of english proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	168 245 263 264 6 50 51 53 61 62 68 69 132 233 134 145
5 6 7 8 8 9 10 11 12 13 14 15 16 17 18 19 20				performing independent monitoring.	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby Instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate movikolad distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	168 245 263 264 6 50 51 53 61 62 68 69 132 233 134 137 145
5 5 6 7 7 8 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22				performing independent monitoring.	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in RM training procedures Lack of adherence to the main CRM rules Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist tredness - Inadequate workload distribution	168 245 263 264 6 50 51 53 61 62 68 69 132 233 134 137 145 148 149
9 10 11 12 13 14 15 16 17 18 19 20 21 22 23				performing independent monitoring.	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist tredness - Inadequate workload distribution Lack of adherence to SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	168 245 263 264 50 51 62 68 69 132 233 134 137 145 146 148 149 150
5 6 7 8 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24				performing independent monitoring.	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes	168 245 263 264 6 50 51 53 61 62 68 132 233 134 137 145 146 148 149 150
5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24				performing independent monitoring.	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in RM training procedures Lack of adherence to the main CRM rules Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate notable in the standard process and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist trequirements definition process and/or training methodology Maintenance technician / airworthiness specialist tredness - Inadequate workload distribution Lack of adherence to SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes Pilot tiredness - inadequate workload distribution	168 245 263 264 50 51 62 68 69 132 233 134 137 145 146 148 149 150
5 6 7 8 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27				performing independent monitoring.	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist rendness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	168 245 263 264 6 50 51 53 61 62 68 69 132 233 134 137 145 146 148 149 150 151
5 6 7 8 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28				performing independent monitoring.	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist redness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes Filot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to the SOP in terms of critical indicators cross-checking Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path paramet	168 245 263 264 6 26 50 51 53 61 62 68 69 132 233 134 137 145 146 148 149 150 151 155 167 168
5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 31				performing independent monitoring.	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist redurements of process and/or training methodology Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to the SOP in terms of critical indicators cross-checking Lack of adherence to SA	168 245 263 264 6 26 50 51 53 61 62 68 132 233 134 137 145 146 148 149 150 151 165 167 168 224 225
5 6 7 8 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30				performing independent monitoring.	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes Pilot tiredness - lnadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g., mountains).	168 245 263 264 6 26 50 51 53 661 62 68 69 132 233 134 137 145 146 148 149 150 151 165 168 224



		Base events	Code	Definition	Identifiable precursors	No.
					Inadequate certification process and / or flaws in methodology concerning verification	
36					of the system / product compliance with requirements - FMS subsystems and	299
L					components (autopilot incl.)	-
37					Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. Navigational aid failure.	303
					Flaws in manufacturer quality control process - FMS subsystem and components	
38					(autopilot incl.)	306
39					Lack of adherence to SOP for AIR operations in terms of controller error in approach	307
					clearence instruction	_
40					Not recognized ground Navaids System failure not reflected in NOTAM messages	308
41					Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)	410
					Flaws in aircraft system maintenance process definition - Ground navigational systems	
42					and components (e.g. ILS)	488
					Inadequate certification process and / or flaws in methodology concerning verification	
43					of the system / product compliance with requirements - Ground navigational systems	489
					and components (e.g. ILS) Flaws in manufacturer quality control process - Ground navigational systems and	+
44					components (e.g. ILS)	490
45					Flaws in aircraft system maintenance process definition - Onboard navigational	491
45					systems and components	_
					Inadequate certification process and / or flaws in methodology concerning verification	
46					of the system / product compliance with requirements - Onboard navigational	492
					systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and	+
47					components.	493
48					Unintuitive and / or error prone system manual - FMS	494
1	26	PNF looking for terrain	AL35B4123	Given an FTTC, PNF fails to detect it due to looking out for the	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151
		looking for terrain		terrain, and hence not performing independent monitoring.	or / and passive contribution to the PF duties	_
3					Pilot tiredness - Inadequate workload distribution	167
4					Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing	168 245
5					Flaws in CRM training procedures	263
6					Lack of adherence to the main CRM rules	264
7					Adverse weather / poor visibility conditions / darkness	6
8					System failure affecting the operation of primary instruments / displays or standby	26
					instruments GPWS / TAWS alert / warning (genuine or spurious)	
9					MSAW warning MSAW warning	50 51
11					Prolonged loss of communications (PLOC) between pilot and controller(s)	53
12					Error in preparation of database for FMS	61
13					Ground Navigational Aid failure	62
14					Inadequate NOTAM information concerning ground navigational aid failure	68
15					Inadequate navigational chart	69
16					Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of	132
17					protecting of critical aircraft systems against contamination	233
18					Use of non-standard phraseology by pilot and/or controller	134
19					Traffic controller tiredness - Inadequate workload distribution	137
20					Flaws in traffic controller requirements definition process and/or training	145
					methodology	_
21					Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	146
22					driver	148
					Flaws in maintenance technician / airworthiness specialist requirements definition	
23					process and/or training methodology	149
24					Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150
_					distribution	1
25					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
26					Current airport diagram not reflecting critical changes	155
27					Pilot tiredness - Inadequate workload distribution	167
28					Flaws in pilot requirements definition process and/or training methodology	168
29					Lack of adherence to the SOP in terms of critical indicators cross-checking	224
30					Lack of adherence to SARPs included in Annex 14 and related documents in terms of	225
эU					RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).	223
31					Lack of adherence to SOP in terms of approach and landing	245
33					Incorrect use of automation - FMS	269
34					Altimeter setting error	274
35					Failure to check navigation accuracy before approach	275
36					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and	299
50					components (autopilot incl.)	299
		1		+	Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting	1
37					systems warning. Navigational aid failure.	303
					Flaws in manufacturer quality control process - FMS subsystem and components	+-
37 38					Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)	303
					Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.) Lack of adherence to SOP for AIR operations in terms of controller error in approach	+-
38					Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.) Lack of adherence to SOP for AIR operations in terms of controller error in approach clearence instruction	306 307
38 39 40					Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.) Lack of adherence to SOP for AIR operations in terms of controller error in approach	306 307 308
38					Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.) Lack of adherence to SOP for AIR operations in terms of controller error in approach clearence instruction Not recognized ground Navaids System failure not reflected in NOTAM messages	306 307
38 39 40 41					Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.) Lack of adherence to SOP for AIR operations in terms of controller error in approach clearence instruction Not recognized ground Navaids System failure not reflected in NOTAM messages Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.) Flaws in aircraft system maintenance process definition - Ground navigational systems	306 307 308 410
38 39 40					Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.) Lack of adherence to SOP for AIR operations in terms of controller error in approach clearence instruction Not recognized ground Navaids System failure not reflected in NOTAM messages Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.) Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS)	306 307 308 410 488
38 39 40 41 42					Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.) Lack of adherence to SOP for AIR operations in terms of controller error in approach clearence instruction Not recognized ground Navaids System failure not reflected in NOTAM messages Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.) Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS) Inadequate certification process and / or flaws in methodology concerning verification	306 307 308 410 488
38 39 40 41					Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.) Lack of adherence to SOP for AIR operations in terms of controller error in approach clearence instruction Not recognized ground Navaids System failure not reflected in NOTAM messages Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.) Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS) inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground navigational systems	306 307 308 410 488
38 39 40 41 42 43					Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.) Lack of adherence to SOP for AIR operations in terms of controller error in approach clearence instruction Not recognized ground Navaids System failure not reflected in NOTAM messages Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.) Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS) Inadequate certification process and / or flaws in methodology concerning verification	306 307 308 410 488
38 39 40 41 42					Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.) Lack of adherence to SOP for AIR operations in terms of controller error in approach clearence instruction Not recognized ground Navaids System failure not reflected in NOTAM messages Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.) Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS) Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS) Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS)	306 307 308 410 488
38 39 40 41 42 43					Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.) Lack of adherence to SOP for AIR operations in terms of controller error in approach clearence instruction Not recognized ground Navaids System failure not reflected in NOTAM messages Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.) Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS) Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS) Flaws in manufacturer quality control process - Ground navigational systems and	306 307 308 410 488



		Base events	Code	Definition	Identifiable precursors	No.
					Inadequate certification process and / or flaws in methodology concerning verification	
46					of the system / product compliance with requirements - Onboard navigational systems and components.	492
47					Flaws in manufacturer quality control process - Onboard navigational systems and	493
					components.	_
48				Given an FTTC, PNF fails to detect it due to being inexperienced and	Unintuitive and / or error prone system manual - FMS	494
1	27	Inexperienced PNF not monitoring PF	AL35B4124	not performing independent monitoring of the more experienced PF.	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
2					Pilot tiredness - Inadequate workload distribution	167
3					Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing	168 245
5					Flaws in CRM training procedures	263
6					Lack of adherence to the main CRM rules	264
7					Adverse weather / poor visibility conditions / darkness	6
8					System failure affecting the operation of primary instruments / displays or standby instruments	26
9 10					GPWS / TAWS alert / warning (genuine or spurious) MSAW warning	50 51
11					Prolonged loss of communications (PLOC) between pilot and controller(s)	53
12					Error in preparation of database for FMS	61
13					Ground Navigational Aid failure	62
14 15					Inadequate NOTAM information concerning ground navigational aid failure	68 69
16					Inadequate navigational chart Lack of English proficiency	132
17					Lack of adherence to SOP during aircraft storage and / or maintenance in terms of	233
					protecting of critical aircraft systems against contamination	
18					Use of non-standard phraseology by pilot and/or controller	134
19					Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training	137
20					methodology	145
21					Lack of or poor communication quality	146
22					Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	148
					driver Flaws in maintenance technician / airworthiness specialist requirements definition	
23					process and/or training methodology	149
24					Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
25					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151
_					or / and passive contribution to the PF duties	
26 27					Current airport diagram not reflecting critical changes Pilot tiredness - Inadequate workload distribution	155 167
28					Flaws in pilot requirements definition process and/or training methodology	168
29					Lack of adherence to the SOP in terms of critical indicators cross-checking	224
					Lack of adherence to SARPs included in Annex 14 and related documents in terms of	
30					RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).	225
31					Lack of adherence to SOP in terms of approach and landing	245
33					Incorrect use of automation - FMS	269
34					Altimeter setting error	274
35					Failure to check navigation accuracy before approach Inadequate certification process and / or flaws in methodology concerning verification	275
36					of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299
37					Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting	303
-					systems warning. Navigational aid failure. Flaws in manufacturer quality control process - FMS subsystem and components	
38					(autopilot incl.)	306
39					Lack of adherence to SOP for AIR operations in terms of controller error in approach clearence instruction	307
40					Not recognized ground Navaids System failure not reflected in NOTAM messages	308
41					Flaws in aircraft system maintenance process definition - FMS subsystems and	410
					components (autopilot incl.) Flaws in aircraft system maintenance process definition - Ground navigational systems	5
42					and components (e.g. ILS)	488
43					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground navigational systems	
					and components (e.g. ILS)	Ľ
44					Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS)	490
45					Flaws in aircraft system maintenance process definition - Onboard navigational	491
É					systems and components Inadequate certification process and / or flaws in methodology concerning verification	
46					of the system / product compliance with requirements - Onboard navigational	492
47					systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and	493
47					components. Unintuitive and / or error prone system manual - FMS	493
-				Given an FTTC, PNF performs independent monitoring, but fails to		
1	28	Failure of on-board monitoring	AL35B42	recognise the trajectory command is incorrect.	Pilot tiredness - Inadequate workload distribution	167
3					Flaws in pilot requirements definition process and/or training methodology Adverse weather / poor visibility conditions / darkness	168 6
4					System failure affecting the operation of primary instruments / displays or standby	26
					instruments	
5					GPWS / TAWS alert / warning (genuine or spurious)	50
6 7					MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s)	51 53
8					Error in preparation of database for FMS	61
9					Ground Navigational Aid failure	62
_						
10 11					Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart	68 69



_		Base events	Code	Definition	Identifiable precursors	No.
13					Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination	233
14					Use of non-standard phraseology by pilot and/or controller	134
15					Traffic controller tiredness - Inadequate workload distribution	137
					Flaws in traffic controller requirements definition process and/or training	
16					methodology	145
17					Lack of or poor communication quality	146
18					Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	148
Н					driver	1
19					Flaws in maintenance technician / airworthiness specialist requirements definition	149
Н					process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	
20					distribution	150
H					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	
21					or / and passive contribution to the PF duties	151
22					Current airport diagram not reflecting critical changes	155
23					Pilot tiredness - Inadequate workload distribution	167
24					Flaws in pilot requirements definition process and/or training methodology	168
25					Lack of adherence to the SOP in terms of critical indicators cross-checking	224
					Lack of adherence to SARPs included in Annex 14 and related documents in terms of	
26					RWY parameters and location, attitude, approach path parameters and obstacles	225
27					locations (e.g. mountains).	245
29					Lack of adherence to SOP in terms of approach and landing Incorrect use of automation - FMS	269
30					Altimeter setting error	274
31					Failure to check navigation accuracy before approach	275
H					Inadequate certification process and / or flaws in methodology concerning verification	1
32					of the system / product compliance with requirements - FMS subsystems and	299
Ш					components (autopilot incl.)	
33					Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting	303
					systems warning. Navigational aid failure.	دەد
34					Flaws in manufacturer quality control process - FMS subsystem and components	306
Н			-		(autopilot incl.)	
35					Lack of adherence to SOP for AIR operations in terms of controller error in approach	307
36					clearence instruction Not recognized ground Navaids System failure not reflected in NOTAM messages	200
30					Flaws in aircraft system maintenance process definition - FMS subsystems and	308
37					components (autopilot incl.)	410
\dashv					Flaws in aircraft system maintenance process definition - Ground navigational systems	
38					and components (e.g. ILS)	488
П					Inadequate certification process and / or flaws in methodology concerning verification	1
39					of the system / product compliance with requirements - Ground navigational systems	
					and components (e.g. ILS)	
40					Flaws in manufacturer quality control process - Ground navigational systems and	490
					components (e.g. ILS)	450
41					Flaws in aircraft system maintenance process definition - Onboard navigational	491
41					systems and components	491
					systems and components Inadequate certification process and / or flaws in methodology concerning verification	
42					systems and components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational	
					systems and components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	
					systems and components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and	
42					systems and components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and components.	492 493
42				Given an FTTC, the PNF suspects the error, but fails to communicate	systems and components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and	492
42 43 44	29	PNF subordinate and silent	AL35B431	Given an FTTC, the PNF suspects the error, but fails to communicate this to PF due to being subordinate and feeling unable to express	systems and components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and components.	492 493
42 43 44	29	PNF subordinate and silent	AL35B431		systems and components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. Unintuitive and / or error prone system manual - FMS	492 493 494
42 43 44 1	29	PNF subordinate and silent	AL35B431	this to PF due to being subordinate and feeling unable to express	systems and components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	492 493 494 167
42 43 44 1 2 3	29	PNF subordinate and silent	AL35B431	this to PF due to being subordinate and feeling unable to express	systems and components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing	492 493 494 167 168 245
42 43 44 1 2 3 4	29	PNF subordinate and silent	AL35B431	this to PF due to being subordinate and feeling unable to express	systems and components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures	492 493 494 167 168 245 263
42 43 44 1 2 3 4 5	29	PNF subordinate and silent	AL35B431	this to PF due to being subordinate and feeling unable to express	systems and components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules	492 493 494 167 168 245 263 264
42 43 44 1 2 3 4 5 6	29	PNF subordinate and silent	AL35B431	this to PF due to being subordinate and feeling unable to express	systems and components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates	492 493 494 167 168 245 263 264 304
42 43 44 1 2 3 4 5 6 7	29	PNF subordinate and silent	AL35B431	this to PF due to being subordinate and feeling unable to express	systems and components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates Adverse weather / poor visibility conditions / darkness	492 493 494 167 168 245 263 264 304 6
42 43 44 1 : 2 : 3 : 4 : 5 :	29	PNF subordinate and silent	AL358431	this to PF due to being subordinate and feeling unable to express	systems and components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates	492 493 494 167 168 245 263 264 304
42 43 44 1 2 3 4 5 6 7	29	PNF subordinate and silent	AL35B431	this to PF due to being subordinate and feeling unable to express	systems and components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby	492 493 494 167 168 245 263 264 304 6
42 43 44 1 2 2 3 4 5 6 7	29	PNF subordinate and silent	AL358431	this to PF due to being subordinate and feeling unable to express	systems and components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments	492 493 494 167 168 245 263 264 304 6
42 43 44 1 : 2 : 3 : 4 : 5 : 6 : 7 : 8 : 9 : 10 :	229	PNF subordinate and silent	AL35B431	this to PF due to being subordinate and feeling unable to express	systems and components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules mbalanced and inapropriate relation between cpt and his subordinates Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious)	492 493 494 167 168 245 263 264 304 6 26
42 43 44 1 2 3 4 5 6 7 7 8 9 10 11 12	229	PNF subordinate and silent	AL358431	this to PF due to being subordinate and feeling unable to express	systems and components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inapropriate relation between cpt and his subordinates Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS	492 493 494 167 168 245 263 264 304 6 26 50 51 53 61
42 43 44 1 2 3 4 5 6 7 8 8 9 10 11 12 13	229	PNF subordinate and silent	AL35B431	this to PF due to being subordinate and feeling unable to express	systems and components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure	492 493 494 167 168 245 263 264 304 6 26 50 51 53 61 62
42 43 44 1 2 3 4 5 6 7 8 8 9 10 11 12 13 14	229	PNF subordinate and silent	AL358431	this to PF due to being subordinate and feeling unable to express	systems and components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure	492 493 494 167 168 245 263 264 304 6 26 50 51 53 61 62 68
42 43 44 1 :: 3 4 4 5 6 7 8 8 9 10 11 12 13 14 15 15	29	PNF subordinate and silent	AL35B431	this to PF due to being subordinate and feeling unable to express	systems and components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inapropriate relation between cpt and his subordinates Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate NOTAM information concerning ground navigational aid failure	492 493 494 167 168 245 263 264 304 6 26 50 51 53 61 62 68 69
42 43 44 1 :: 2 3 4 5 6 7 8 8 9 10 11 12 13 14	229	PNF subordinate and silent	AL35B431	this to PF due to being subordinate and feeling unable to express	systems and components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inapropriate relation between cpt and his subordinates Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate NOTAM information concerning ground navigational aid failure Lack of English proficiency	492 493 494 167 168 245 263 264 304 6 26 50 51 53 61 62 68
42 43 44 1 :: 3 4 4 5 6 6 7 8 8 9 10 11 12 13 14 15	229	PNF subordinate and silent	AL35B431	this to PF due to being subordinate and feeling unable to express	systems and components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate NOTAM information concerning ground navigational aid failure Lack of English proficiency Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of	492 493 494 167 168 245 263 264 304 6 26 50 51 53 61 62 68 69
42 43 44 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17	229	PNF subordinate and silent	AL35B431	this to PF due to being subordinate and feeling unable to express	systems and components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination	492 493 494 167 168 245 263 304 6 26 50 51 53 61 62 68 69 132 233
42 43 44 1 2 2 3 4 5 6 7 8 8 9 10 11 12 12 13 14 15 16 17 18	229	PNF subordinate and silent	AL35B431	this to PF due to being subordinate and feeling unable to express	systems and components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate anavigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller	492 493 494 167 168 245 263 304 6 26 50 51 53 61 62 68 69 132 233
42 43 44 1 2 3 4 4 5 6 7 8 8 9 10 11 12 13 14 15 16 17 18 19 19	229	PNF subordinate and silent	AL35B431	this to PF due to being subordinate and feeling unable to express	systems and components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller Tiredness - inadequate workload distribution	492 493 494 167 168 245 263 264 304 6 26 50 51 62 68 69 132 233 134 137
42 43 44 1 2 2 3 4 5 6 7 8 8 9 10 11 12 12 13 14 15 16 17 18	29	PNF subordinate and silent	AL35B431	this to PF due to being subordinate and feeling unable to express	systems and components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate anavigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller	492 493 494 167 168 245 263 304 6 26 50 51 53 61 62 68 69 132 233
42 43 44 1 2 3 4 4 5 6 7 8 8 9 10 11 12 13 14 15 16 17 18 19 19	229	PNF subordinate and silent	AL35B431	this to PF due to being subordinate and feeling unable to express	systems and components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inapropriate relation between cpt and his subordinates Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller requirements definition process and/or training	492 493 494 167 168 245 263 264 304 6 26 50 51 62 68 69 132 233 134 137
42 43 44 1 2 3 4 5 6 7 8 8 9 10 11 12 13 14 15 16 17 18 19 20 21	229	PNF subordinate and silent	AL35B431	this to PF due to being subordinate and feeling unable to express	systems and components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate anavigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology	492 493 494 167 168 245 263 304 6 26 50 51 62 68 69 132 233 134 137 145
42 43 44 1 2 3 4 5 6 7 8 8 9 10 11 12 13 14 15 16 17 18 19 20	229	PNF subordinate and silent	AL35B431	this to PF due to being subordinate and feeling unable to express	systems and components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	492 493 494 167 168 245 263 304 6 26 50 51 53 69 132 233 134 137 145
42 43 44 1 2 3 4 5 6 7 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	229	PNF subordinate and silent	AL358431	this to PF due to being subordinate and feeling unable to express	systems and components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition	492 493 494 167 168 245 263 264 304 6 26 50 51 62 68 69 132 233 134 137 145 146
42 43 44 1 2 3 4 5 6 7 8 8 9 10 11 12 13 14 15 16 17 18 19 20 21	229	PNF subordinate and silent	AL358431	this to PF due to being subordinate and feeling unable to express	systems and components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational Aid failure Inadequate navigational Aid failure Inadequate navigational chart Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	492 493 494 167 168 245 263 304 6 26 50 51 62 68 69 132 233 134 137 145
42 43 44 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	229	PNF subordinate and silent	AL35B431	this to PF due to being subordinate and feeling unable to express	systems and components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inapropriate relation between cpt and his subordinates Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in traffic controller requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tredness - Inadequate workload	492 493 494 167 168 245 263 264 304 6 26 50 51 62 68 69 132 233 134 137 145 146
42 43 44 1 2 3 4 4 5 6 6 7 7 8 8 9 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	229	PNF subordinate and silent	AL35B431	this to PF due to being subordinate and feeling unable to express	systems and components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate not sop during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	492 493 494 167 168 245 263 264 6 50 51 53 61 62 68 69 132 233 134 137 145 146
42 43 44 1 : 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	229	PNF subordinate and silent	AL358431	this to PF due to being subordinate and feeling unable to express	systems and components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of afherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist tredness - Inadequate workload distribution Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	492 493 494 167 168 245 263 264 6 50 51 53 61 62 68 69 132 233 134 137 145 146
42 43 44 1 2 2 3 3 4 4 5 5 6 7 7 8 8 9 10 11 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 5	229	PNF subordinate and silent	AL35B431	this to PF due to being subordinate and feeling unable to express	systems and components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inapropriate relation between cpt and his subordinates Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate NoTAM information was against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in traffic controller requirements definition process and/or training methodology Maintenance technician / airworthiness specialist trequirements definition process and/or training methodology Airmonance technician / airworthiness specialist tredness - Inadequate workload distribution	492 493 494 167 168 245 263 304 6 26 50 51 62 63 63 69 132 233 134 137 145 146 148 149 150
42 43 44 1 1 2 3 44 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25	229	PNF subordinate and silent	AL35B431	this to PF due to being subordinate and feeling unable to express	systems and components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate not sop during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist tredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes	492 493 494 167 168 245 263 304 6 50 51 53 61 62 68 69 132 233 134 137 145 146 148 149 150 151
42 43 44 1 2 2 3 4 4 5 6 7 8 8 9 10 11 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27	229	PNF subordinate and silent	AL358431	this to PF due to being subordinate and feeling unable to express	systems and components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of afglish proficiency Lack of onon-standard phraseology by pilot and/or controller Traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist trequirements definition process and/or training methodology Maintenance technician / airworthiness specialist trequirements definition process and/or training methodology Maintenance technician / airworthiness specialist tredurements of process and/or training methodology Maintenance technician / airworthiness specialist treduress - Inadequate workload distribution	492 493 494 167 168 245 263 304 6 26 50 51 53 61 62 68 69 132 233 134 145 148 149 150 151 155 167
42 43 44 1 1 2 3 44 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25	229	PNF subordinate and silent	AL35B431	this to PF due to being subordinate and feeling unable to express	systems and components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate not sop during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist tredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes	492 493 494 167 168 245 263 304 6 50 51 53 61 62 68 69 132 233 134 137 145 146 148 149 150 151



	Base events	Code	Definition	Identifiable precursors	No.
				Lack of adherence to SARPs included in Annex 14 and related documents in terms of	
30				RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).	225
31					245
33					269
34 35				Altimeter setting error Failure to check navigation accuracy before approach	274 275
33				Inadequate certification process and / or flaws in methodology concerning verification	2/3
36				of the system / product compliance with requirements - FMS subsystems and	299
				components (autopilot incl.)	
37				Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. Navigational aid failure.	303
20				Flaws in manufacturer quality control process - FMS subsystem and components	200
38				(autopilot incl.)	306
39				Lack of adherence to SOP for AIR operations in terms of controller error in approach clearence instruction	307
40					308
41				Flaws in aircraft system maintenance process definition - FMS subsystems and	410
41				components (autopilot incl.)	410
42				Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS)	488
				Inadequate certification process and / or flaws in methodology concerning verification	
43					489
				and components (e.g. ILS)	
44				Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS)	490
				Flaws in aircraft system maintenance process definition - Onboard navigational	
45				systems and components	491
46				Inadequate certification process and / or flaws in methodology concerning verification	402
46				of the system / product compliance with requirements - Onboard navigational systems and components.	492
				Flaws in manufacturer quality control process - Onboard navigational systems and	
47				components.	493
48			a: strain and a district	Unintuitive and / or error prone system manual - FMS	494
1 30	PNF superior and sil	nt AL35B432	Given an FTTC, the PNF recognises the error, but fails to communicate this in order to test or train the PF.	Pilot tiredness - Inadequate workload distribution	167
2			communicate this in order to test of train the FF.	Flaws in pilot requirements definition process and/or training methodology	168
3				Lack of adherence to SOP in terms of approach and landing	245
4				Flaws in CRM training procedures	263
6				Lack of adherence to the main CRM rules Adverse weather / poor visibility conditions / darkness	264 6
				System failure affecting the operation of primary instruments / displays or standby	
7				instruments	26
8					50
9 10				MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s)	51 53
11					61
12					62
13			_		68
15					69 132
16				Lack of adherence to SOP during aircraft storage and / or maintenance in terms of	233
				protecting of critical aircraft systems against contamination	
17 18					134 137
19				Flaws in traffic controller requirements definition process and/or training	145
				methodology	
20				Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	146
21				driver	148
22				Flaws in maintenance technician / airworthiness specialist requirements definition	149
				process and/or training methodology	149
23				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
24			<u> </u>	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	4
24				or / and passive contribution to the PF duties	151
25					155
26 27					167 168
28				Lack of adherence to the SOP in terms of critical indicators cross-checking	224
\top				Lack of adherence to SARPs included in Annex 14 and related documents in terms of	
29				RWY parameters and location, attitude, approach path parameters and obstacles	225
30			+	locations (e.g. mountains). Lack of adherence to SOP in terms of approach and landing	245
32				Incorrect use of automation - FMS	269
33 34					274
	+		+	Failure to check navigation accuracy before approach Inadequate certification process and / or flaws in methodology concerning verification	275
34				of the system / product compliance with requirements - FMS subsystems and	299
35					
				components (autopilot incl.)	_
				Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting	303
35 36				Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. Navigational aid failure.	
35				Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting	303 306
35 36 37				Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. Navigational aid failure. Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.) Lack of adherence to SOP for AIR operations in terms of controller error in approach	306
35 36 37 38				Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. Navigational aid failure. Flaws in mandscturer quality control process - FMS subsystem and components (autopilot incl.) Lack of adherence to SOP for AIR operations in terms of controller error in approach clearence instruction	306 307
35 36 37 38 39				Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. Navigational aid failure. Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.) Lack of adherence to SOP for AIR operations in terms of controller error in approach clearence instruction Not recognized ground Navaids System failure not reflected in NOTAM messages	306 307 308
35 36 37 38				Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. Navigational aid failure. Flaws in mandscturer quality control process - FMS subsystem and components (autopilot incl.) Lack of adherence to SOP for AIR operations in terms of controller error in approach clearence instruction	306 307



		Base events	Code	Definition	Identifiable precursors	No.
42					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS)	
43					Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS)	490
44					Flaws in aircraft system maintenance process definition - Onboard navigational	491
Н					systems and components Inadequate certification process and / or flaws in methodology concerning verification	
45					of the system / product compliance with requirements - Onboard navigational systems and components.	492
46					Flaws in manufacturer quality control process - Onboard navigational systems and components.	493
47					Unintuitive and / or error prone system manual - FMS	494
1	31	Press-on-itis	AL35B441	Given an FTTC, PNF expresses concerns about the trajectory command but the pilot continues without correcting it	Pilot tiredness - Inadequate workload distribution	167
2				·	Flaws in pilot requirements definition process and/or training methodology	168
3					Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures	245 263
5					Lack of adherence to the main CRM rules	264
6 7					Imbalanced and inaproppriate relation between cpt and his subordinates Adverse weather / poor visibility conditions / darkness	304 6
8					System failure affecting the operation of primary instruments / displays or standby	26
9					instruments GPWS / TAWS alert / warning (genuine or spurious)	50
10					MSAW warning	51
11 12					Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS	53 61
13					Ground Navigational Aid failure	62
14 15					Inadequate NOTAM information concerning ground navigational aid failure	68 69
16					Inadequate navigational chart Lack of English proficiency	132
17					Lack of adherence to SOP during aircraft storage and / or maintenance in terms of	233
18					protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller	134
19					Traffic controller tiredness - Inadequate workload distribution	137
20					Flaws in traffic controller requirements definition process and/or training methodology	145
21					Lack of or poor communication quality	146
22					Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	148
23					Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
24					Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150
25					distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151
26					or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes	155
27					Pilot tiredness - Inadequate workload distribution	167
28 29					Flaws in pilot requirements definition process and/or training methodology Lack of adherence to the SOP in terms of critical indicators cross-checking	168 224
23					Lack of adherence to the SOP in terms of chickan indicators cross-checking Lack of adherence to SARPs included in Annex 14 and related documents in terms of	224
30					RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).	225
31					Lack of adherence to SOP in terms of approach and landing	245
33 34					Incorrect use of automation - FMS Altimeter setting error	269 274
35					Failure to check navigation accuracy before approach	275
					Inadequate certification process and / or flaws in methodology concerning verification	
36					of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299
37					Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. Navigational aid failure.	303
38					Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)	306
39					Lack of adherence to SOP for AIR operations in terms of controller error in approach	307
40					clearence instruction Not recognized ground Navaids System failure not reflected in NOTAM messages	307
41					Not recognized ground navalos system rature not renected in NO FAM messages Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)	410
42					Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS)	488
43					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground navigational systems	
44					and components (e.g. ILS) Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS)	490
45					Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491
46					inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational	n 492
47					systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and components.	493
48					Components. Unintuitive and / or error prone system manual - FMS	494
1	32	ATC disregard flight crew concerns	AL35B442	Given an FTTC, flight crew express concerns about the trajectory command but the controller confirms it and the flight crew execute		167
2				it		
3					Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing	168 245
4					Flaws in CRM training procedures Lack of adherence to the main CRM rules	263 264
5						



		Base events	Code	Definition	Identifiable precursors	No.
7		base events	Couc	Deminion	System failure affecting the operation of primary instruments / displays or standby	26
′					instruments	
8					GPWS / TAWS alert / warning (genuine or spurious) MSAW warning	50 51
10					Prolonged loss of communications (PLOC) between pilot and controller(s)	53
11					Error in preparation of database for FMS	61
12 13					Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure	62 68
14					Inadequate navigational chart	69
15					Lack of English proficiency	132
16					Lack of adherence to SOP during aircraft storage and / or maintenance in terms of	233
17					protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller	134
18					Traffic controller tiredness - Inadequate workload distribution	137
19					Flaws in traffic controller requirements definition process and/or training	145
					methodology	
20					Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	146
21					driver	148
22					Flaws in maintenance technician / airworthiness specialist requirements definition	149
					process and/or training methodology	1.5
23					Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151
24					or / and passive contribution to the PF duties	
25					Current airport diagram not reflecting critical changes	155
26 27					Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168
28					Lack of adherence to the SOP in terms of critical indicators cross-checking	224
					Lack of adherence to SARPs included in Annex 14 and related documents in terms of	
29					RWY parameters and location, attitude, approach path parameters and obstacles	225
30					locations (e.g. mountains). Lack of adherence to SOP in terms of approach and landing	245
32					Incorrect use of automation - FMS	269
33					Altimeter setting error	274
34					Failure to check navigation accuracy before approach	275
35					Inadequate certification process and / or flaws in methodology concerning verification	299
35					of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299
26					Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting	202
36					systems warning. Navigational aid failure.	303
37					Flaws in manufacturer quality control process - FMS subsystem and components	306
\dashv					(autopilot incl.) Lack of adherence to SOP for AIR operations in terms of controller error in approach	-
38					clearence instruction	307
39					Not recognized ground Navaids System failure not reflected in NOTAM messages	308
40					Flaws in aircraft system maintenance process definition - FMS subsystems and	410
\dashv					components (autopilot incl.) Flaws in aircraft system maintenance process definition - Ground navigational systems	
41					and components (e.g. ILS)	488
П					Inadequate certification process and / or flaws in methodology concerning verification	
42					of the system / product compliance with requirements - Ground navigational systems	489
\dashv					and components (e.g. ILS) Flaws in manufacturer quality control process - Ground navigational systems and	
43					components (e.g. ILS)	490
44					Flaws in aircraft system maintenance process definition - Onboard navigational	491
					systems and components	
45					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational	492
43					systems and components.	492
46					Flaws in manufacturer quality control process - Onboard navigational systems and	493
					components.	_
47 III +					Unintuitive and / or error prone system manual - FMS	494
H +	II	Flight crew loss of situation awareness			Flight crew loss of situation awareness	
1		Imminent CFIT above decision height				-
1 3	33	(DH)	AL35C2	An imminent CFIT occurs when aircraft is above the decision height	GPWS / TAWS alert / warning (genuine or spurious)	50
2		,			Adverse weather / poor visibility conditions / darkness	6
3					System failure affecting the operation of primary instruments / displays or standby	26
4					instruments CRIMS / TAMS plots / warning /gonuing or cruzious)	50
5					GPWS / TAWS alert / warning (genuine or spurious) MSAW warning	51
6					Prolonged loss of communications (PLOC) between pilot and controller(s)	53
7					Error in preparation of database for FMS	61
9					Ground Navigational Aid failure	62 68
10					Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart	69
11					Lack of English proficiency	132
12					Lack of adherence to SOP during aircraft storage and / or maintenance in terms of	233
					protecting of critical aircraft systems against contamination	134
					Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution	134
13						
13					Flaws in traffic controller requirements definition process and/or training	
13 14 15					methodology	145
13					methodology Lack of or poor communication quality	145
13 14 15					methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	_
13 14 15 16					methodology Lack of or poor communication quality	146 148
13 14 15 16					methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	146



20		Base events	Code	Definition	Identifiable precursors	No.
20					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151
21					or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes	155
22					Pilot tiredness - Inadequate workload distribution	167
23					Flaws in pilot requirements definition process and/or training methodology	168
24					Lack of adherence to the SOP in terms of critical indicators cross-checking	224
25					Lack of adherence to SARPs included in Annex 14 and related documents in terms of	225
23					RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).	223
26					Lack of adherence to SOP in terms of approach and landing	245
28					Incorrect use of automation - FMS	269
29					Altimeter setting error	274
30					Failure to check navigation accuracy before approach Inadequate certification process and / or flaws in methodology concerning verification	275
31					of the system / product compliance with requirements - FMS subsystems and	299
					components (autopilot incl.)	
32					Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting	303
-			-		systems warning. Navigational aid failure. Flaws in manufacturer quality control process - FMS subsystem and components	\vdash
33					(autopilot incl.)	306
7.					Lack of adherence to SOP for AIR operations in terms of controller error in approach	207
34					clearence instruction	307
35					Not recognized ground Navaids System failure not reflected in NOTAM messages	308
36					Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)	410
\exists					Flaws in aircraft system maintenance process definition - Ground navigational systems	
37					and components (e.g. ILS)	488
٦					Inadequate certification process and / or flaws in methodology concerning verification	
38					of the system / product compliance with requirements - Ground navigational systems	489
\dashv			 		and components (e.g. ILS) Flaws in manufacturer quality control process - Ground navigational systems and	\vdash
39					components (e.g. ILS)	490
40					Flaws in aircraft system maintenance process definition - Onboard navigational	491
40					systems and components	\blacksquare
41					Inadequate certification process and / or flaws in methodology concerning verification	
41					of the system / product compliance with requirements - Onboard navigational systems and components.	492
					Flaws in manufacturer quality control process - Onboard navigational systems and	
42					components.	493
43					Unintuitive and / or error prone system manual - FMS	494
44					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151
45					or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution	167
46					Flaws in pilot requirements definition process and/or training methodology	168
47					Lack of adherence to SOP in terms of approach and landing	245
48					Flaws in CRM training procedures	263
49					Lack of adherence to the main CRM rules	264
50				Given an imminent CFIT above decision height (DH), the terrain	Imbalanced and inaproppriate relation between cpt and his subordinates	304
1	34	Low visibility over terrain	AL35B2111	ahead is in effect invisible due to cloud, fog etc	Adverse weather / poor visibility conditions / darkness	6
2					Adverse weather / poor visibility conditions / darkness	1-
3						6
4					System failure affecting the operation of primary instruments / displays or standby	-
5					instruments	26
_					instruments GPWS / TAWS alert / warning (genuine or spurious)	26 50
6					instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning	26
6 7					instruments GPWS / TAWS alert / warning (genuine or spurious)	26 50 51
7 8					instruments GPMS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure	26 50 51 53 61 62
7 8 9					Instruments GPMS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure	26 50 51 53 61 62 68
7 8 9 10					Instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart	26 50 51 53 61 62 68 69
7 8 9 10 11					Instruments GPMS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure	26 50 51 53 61 62 68 69 132
7 8 9 10					Instruments GPMS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid fallure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency	26 50 51 53 61 62 68 69
7 8 9 10 11 12					instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller	26 50 51 53 61 62 68 69 132 233
7 8 9 10 11					Instruments GPMS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid fallure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution	26 50 51 53 61 62 68 69 132 233
7 8 9 10 11 12					Instruments GPMS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller triedness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training	26 50 51 53 61 62 68 69 132 233
7 8 9 10 11 12 13 14					Instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology	26 50 51 53 61 62 68 69 132 233 134 137
7 8 9 10 11 12 13 14 15					Instruments GPMS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller triedness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training	26 50 51 53 61 62 68 69 132 233 134 137 145
7 8 9 10 11 12 13 14					Instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	26 50 51 53 61 62 68 69 132 233 134 137
7 8 9 10 11 12 13 14 15					Instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition	26 50 51 53 61 62 68 69 132 233 134 137 145
7 8 9 10 11 12 13 14 15 16 17					instruments GPMS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	26 50 51 53 61 62 68 69 132 233 134 137 145 146 148
7 8 9 10 11 12 13 14 15 16					Instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of English proficiency Lack of or forence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist requirements definition	26 50 51 53 61 62 68 69 132 233 134 137 145 146 148
7 8 9 10 11 12 13 14 15 16 17 18					instruments GPMS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	26 50 51 53 61 62 68 69 132 233 134 137 145 146 148
7 8 9 10 11 12 13 14 15 16 17 18					Instruments GPMS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist requirements definition process and/or training methodology	26 50 51 53 61 62 68 69 132 233 134 137 145 146 148 149 150
7 8 9 10 11 12 13 14 15 16 17 18 19 20					instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes	26 50 51 62 68 69 132 233 134 137 145 146 148 149 150
7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22					instruments GPMS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes Pilot tiredness - Inadequate workload distribution	26 50 51 53 61 62 68 69 132 233 134 137 145 146 148 149 150 151
7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23					instruments GPMS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	26 50 51 53 61 62 68 69 132 233 134 137 145 146 148 149 150 151 155 167 168
7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22					instruments GPMS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes Pilot tiredness - Inadequate workload distribution	26 50 51 53 61 62 68 69 132 233 134 137 145 146 148 149 150 151
7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23					instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	26 50 51 53 61 62 68 69 132 233 134 137 145 146 148 149 150 151 155 167 168
7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25					instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to ASAPS included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).	26 50 51 53 61 62 68 69 132 233 134 137 145 146 149 150 151 168 224 225
7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26					instruments GPMS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of fadherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to the SOP in terms of critical indicators cross-checking Lack of adherence to SAPPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach and landing Lack of adherence to SOP in terms of approach and landing	26 50 51 53 61 62 68 69 132 233 134 137 145 146 148 149 150 151 155 167 168 224 225
7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 28					instruments GPMS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Used of onon-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes Piliot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to the SOP in terms of critical indicators cross-checking Lack of adherence to the SOP in terms of critical indicators cross-checking Lack of adherence to SAPs included in Annax 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). Lack of adherence to SAPs included in Annax 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).	26 50 51 53 61 62 68 69 132 233 134 145 146 148 149 150 151 168 224 225 269
7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26					instruments GPMS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of fadherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to the SOP in terms of critical indicators cross-checking Lack of adherence to SAPPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach and landing Lack of adherence to SOP in terms of approach and landing	26 50 51 53 61 62 68 69 132 233 134 137 145 146 148 149 150 151 155 167 168 224 225
7 8 9 10 11 12 13 14 15 16 17 18 20 21 22 23 24 25 26 28 29					instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist triedness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g., mountains). Lack of adherence to SOP in terms of approach and landing Incorrect use of automation - FMS Altimeter setting error	26 50 51 53 61 62 68 69 132 233 134 145 146 148 149 150 151 155 167 224 225 245 269 274 275
7 8 9 10 11 12 13 14 15 16 17 18 20 21 22 23 24 25 26 28 29					instruments GPWS/TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid fallure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or/ and passive contribution to the PF duties Current airport diagram not reflecting critical changes Pilot tiredness - Inadequate workload distribution Lack of adherence to SARPs included in Annex 14 and related documents in terms of Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). Lack of adherence to SOP in terms of approach and landing Incorrect use of automation - FMS Altimeter settling error Failure to check navigation accuracy before approach	26 50 51 53 61 62 68 69 132 233 134 145 146 148 149 150 151 155 167 224 225 245 269 274 275
7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 28 29 30 1					instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller triedness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist requirements definition process and/or training methodology Flaws in maintenance technician / airworthiness specialist requirements of situation monitoring or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes Filot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to the SOP in terms of critical indicators cross-checking Lack of adherence to the SOP in terms of critical indicators cross-checking Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). Lack of adherence to SOP in terms of approach and landing Incorrect use of automation - FMS Altimeter setting error Failure to check navi	26 50 51 53 61 62 68 69 132 233 134 137 145 146 149 150 151 167 168 224 225 269 274



		Base events	Code	Definition	Identifiable precursors	No.
33					Flaws in manufacturer quality control process - FMS subsystem and components	306
Н					(autopilot incl.) Lack of adherence to SOP for AIR operations in terms of controller error in approach	\vdash
34					clearence instruction	307
35					Not recognized ground Navaids System failure not reflected in NOTAM messages Flaws in aircraft system maintenance process definition - FMS subsystems and	308
36					components (autopilot incl.)	410
37					Flaws in aircraft system maintenance process definition - Ground navigational systems	488
\vdash					and components (e.g. ILS) Inadequate certification process and / or flaws in methodology concerning verification	
38					of the system / product compliance with requirements - Ground navigational systems	
Ш					and components (e.g. ILS)	
39					Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS)	490
40					Flaws in aircraft system maintenance process definition - Onboard navigational	491
40					systems and components	
41					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational	492
					systems and components.	
42					Flaws in manufacturer quality control process - Onboard navigational systems and	493
43					components. Unintuitive and / or error prone system manual - FMS	494
44					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	
45					or / and passive contribution to the PF duties	
46					Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168
47					Lack of adherence to SOP in terms of approach and landing	245
48 49					Flaws in CRM training procedures Lack of adherence to the main CRM rules	263 264
50					Imbalanced and inaproppriate relation between cpt and his subordinates	304
	2.5			Given an imminent CFIT above DH, the terrain ahead is in effect		
1	35	Dark terrain	AL35B2112	invisible due to darkness combined with lack of illumination on the terrain.	Adverse weather / poor visibility conditions / darkness	6
2				- Corronn	Adverse weather / poor visibility conditions / darkness	6
3					System failure affecting the operation of primary instruments / displays or standby	26
4					instruments GPWS / TAWS alert / warning (genuine or spurious)	50
5					MSAW warning	51
6					Prolonged loss of communications (PLOC) between pilot and controller(s)	53
7 8					Error in preparation of database for FMS Ground Navigational Aid failure	61 62
9					Inadequate NOTAM information concerning ground navigational aid failure	68
10					Inadequate navigational chart	69
11					Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of	132
12					protecting of critical aircraft systems against contamination	233
13					Use of non-standard phraseology by pilot and/or controller	134
14					Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training	137
15					methodology	145
16					Lack of or poor communication quality	146
17					Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	148
18					Flaws in maintenance technician / airworthiness specialist requirements definition	149
Ĥ					process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	
19					distribution	150
20					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151
21					or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes	155
22					Pilot tiredness - Inadequate workload distribution	167
23					Flaws in pilot requirements definition process and/or training methodology	168
24					Lack of adherence to the SOP in terms of critical indicators cross-checking Lack of adherence to SARPs included in Annex 14 and related documents in terms of	224
25					RWY parameters and location, attitude, approach path parameters and obstacles	225
26					locations (e.g. mountains).	245
28					Lack of adherence to SOP in terms of approach and landing Incorrect use of automation - FMS	269
29					Altimeter setting error	274
30					Failure to check navigation accuracy before approach Inadequate certification process and / or flaws in methodology concerning verification	275
31					of the system / product compliance with requirements - FMS subsystems and	299
Ш					components (autopilot incl.)	
32					Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. Navigational aid failure.	303
33					Flaws in manufacturer quality control process - FMS subsystem and components	306
23					(autopilot incl.)	300
34					Lack of adherence to SOP for AIR operations in terms of controller error in approach clearence instruction	307
35					Not recognized ground Navaids System failure not reflected in NOTAM messages	308
					Flaws in aircraft system maintenance process definition - FMS subsystems and	410
36		l .			components (autopilot incl.) Flaws in aircraft system maintenance process definition - Ground navigational systems	
Н						488
36 37					and components (e.g. ILS)	₩
37					and components (e.g. ILS) Inadequate certification process and / or flaws in methodology concerning verification	
Н					and components (e.g. ILS) Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground navigational systems	
37					and components (e.g. ILS) Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS) Flaws in manufacturer quality control process - Ground navigational systems and	489
37					and components (e.g. ILS) Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS)	



		Base events	Code	Definition	Identifiable precursors	No.
					Inadequate certification process and / or flaws in methodology concerning verification	n
41					of the system / product compliance with requirements - Onboard navigational	492
_					systems and components.	₩
42					Flaws in manufacturer quality control process - Onboard navigational systems and components.	493
43					Unintuitive and / or error prone system manual - FMS	494
					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	
44					or / and passive contribution to the PF duties	151
45					Pilot tiredness - Inadequate workload distribution	167
46					Flaws in pilot requirements definition process and/or training methodology	168
47 48					Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures	245 263
48					Lack of adherence to the main CRM rules	264
50					Imbalanced and inaproppriate relation between cpt and his subordinates	304
	25	en i de la la la la la la la la la la la la la	41050040	Given an imminent CFIT above DH with visible terrain ahead, flight	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	_
1	36	Flight crew fail to see visible terrain	AL35B212	crew fail to see the terrain in time to avoid an imminent CFIT.	or / and passive contribution to the PF duties	151
2					Pilot tiredness - Inadequate workload distribution	167
3					Flaws in pilot requirements definition process and/or training methodology	168
4 5					Lack of adherence to SOP in terms of approach and landing	245
5					Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby	6
6					instruments	26
7					GPWS / TAWS alert / warning (genuine or spurious)	50
8					MSAW warning	51
9					Prolonged loss of communications (PLOC) between pilot and controller(s)	53
10					Error in preparation of database for FMS	61
11					Ground Navigational Aid failure	62
12 13					Inadequate NOTAM information concerning ground navigational aid failure	68
13					Inadequate navigational chart Lack of English proficiency	69 132
					Lack of adherence to SOP during aircraft storage and / or maintenance in terms of	
15					protecting of critical aircraft systems against contamination	233
16					Use of non-standard phraseology by pilot and/or controller	134
17					Traffic controller tiredness - Inadequate workload distribution	137
18					Flaws in traffic controller requirements definition process and/or training	145
40					methodology	_
19					Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	146
20					driver	148
					Flaws in maintenance technician / airworthiness specialist requirements definition	1
21					process and/or training methodology	149
22					Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150
					distribution	
23					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151
24					or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes	155
25					Pilot tiredness - Inadequate workload distribution	167
26					Flaws in pilot requirements definition process and/or training methodology	168
27					Lack of adherence to the SOP in terms of critical indicators cross-checking	224
					Lack of adherence to SARPs included in Annex 14 and related documents in terms of	
28					RWY parameters and location, attitude, approach path parameters and obstacles	225
					locations (e.g. mountains).	245
29 31					Lack of adherence to SOP in terms of approach and landing Incorrect use of automation - FMS	245 269
32					Altimeter setting error	274
33					Failure to check navigation accuracy before approach	275
					Inadequate certification process and / or flaws in methodology concerning verification	-
34					of the system / product compliance with requirements - FMS subsystems and	299
					components (autopilot incl.)	
35					Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting	303
_					systems warning. Navigational aid failure.	₩
36					Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)	306
-					Lack of adherence to SOP for AIR operations in terms of controller error in approach	+
37			<u> </u>		clearence instruction	307
38					Not recognized ground Navaids System failure not reflected in NOTAM messages	308
39					Flaws in aircraft system maintenance process definition - FMS subsystems and	410
_					components (autopilot incl.)	
40					Flaws in aircraft system maintenance process definition - Ground navigational systems	488
-					and components (e.g. ILS) Inadequate certification process and / or flaws in methodology concerning verification	.—
41						
					and components (e.g. ILS)	
42					Flaws in manufacturer quality control process - Ground navigational systems and	490
42					components (e.g. ILS)	490
43					Flaws in aircraft system maintenance process definition - Onboard navigational	491
_					systems and components	_
44					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492
45					Flaws in manufacturer quality control process - Onboard navigational systems and	400
45					components.	493
46					Unintuitive and / or error prone system manual - FMS	494
47					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151
					or / and passive contribution to the PF duties	_
48					Pilot tiredness - Inadequate workload distribution	167
49 50					Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing	168 245
51					Flaws in CRM training procedures	263
52					Lack of adherence to the main CRM rules	264
53					Imbalanced and inaproppriate relation between cpt and his subordinates	304
					· · · · · · · · · · · · · · · · · · ·	



	Base events	Code	Definition	Identifiable precursors	No.
37	Unsuccessful avoidance of observed terrain	AL35B213	Given an imminent CFIT above DH, the flight crew see the terrain ahead but fail to avoid an imminent CFIT.	Natural or artificial obstacle on runway course	60
	terrain	1	ariead but fail to avoid an infilinient Crift.	Pilot tiredness - Inadequate workload distribution	167
				Flaws in pilot requirements definition process and/or training methodology	168
				Lack of adherence to SARPs included in Annex 14 and related documents in terms of	295
	+	+		RWY parameters and location, approach path parameters and obstacles locations. Adverse weather / poor visibility conditions / darkness	6
	<u> </u>	+		System failure affecting the operation of primary instruments / displays or standby	
				instruments	26
				GPWS / TAWS alert / warning (genuine or spurious)	50
				MSAW warning	51
_				Prolonged loss of communications (PLOC) between pilot and controller(s)	53
1	+			Error in preparation of database for FMS Ground Navigational Aid failure	61 62
!	+	 		Inadequate NOTAM information concerning ground navigational aid failure	68
1				Inadequate navigational chart	69
l .				Lack of English proficiency	132
;				Lack of adherence to SOP during aircraft storage and / or maintenance in terms of	233
i		-		protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller	134
,	+	+		Traffic controller tiredness - Inadequate workload distribution	137
				Flaws in traffic controller requirements definition process and/or training	
3				methodology	145
)				Lack of or poor communication quality	146
,		1		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	148
+-		+		driver	
		1		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
+-		†		Maintenance technician / airworthiness specialist tiredness - Inadequate workload	
!	<u> </u>			distribution	150
				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151
		1		or / and passive contribution to the PF duties	
		+		Current airport diagram not reflecting critical changes	155
; ;	+	+		Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168
,	+	 		Lack of adherence to the SOP in terms of critical indicators cross-checking	224
				Lack of adherence to SARPs included in Annex 14 and related documents in terms of	
3				RWY parameters and location, attitude, approach path parameters and obstacles	225
				locations (e.g. mountains).	┡
)	+	-		Lack of adherence to SOP in terms of approach and landing	245
!	+	+		Incorrect use of automation - FMS Altimeter setting error	269 274
1	+	+		Failure to check navigation accuracy before approach	275
_	1	<u> </u>		Inadequate certification process and / or flaws in methodology concerning verification	
l.				of the system / product compliance with requirements - FMS subsystems and	299
				components (autopilot incl.)	ㄴ
;				Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting	303
+		-		systems warning. Navigational aid failure. Flaws in manufacturer quality control process - FMS subsystem and components	⊢
5				(autopilot incl.)	306
_				Lack of adherence to SOP for AIR operations in terms of controller error in approach	
'				clearence instruction	307
3				Not recognized ground Navaids System failure not reflected in NOTAM messages	308
,				Flaws in aircraft system maintenance process definition - FMS subsystems and	410
+		+		components (autopilot incl.) Flaws in aircraft system maintenance process definition - Ground navigational systems	⊢
)				and components (e.g. ILS)	488
_	1	<u> </u>		Inadequate certification process and / or flaws in methodology concerning verification	т
ı.				of the system / product compliance with requirements - Ground navigational systems	
				and components (e.g. ILS)	
:				Flaws in manufacturer quality control process - Ground navigational systems and	490
₩	+	-		components (e.g. ILS)	H
1				Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491
\vdash		 		Inadequate certification process and / or flaws in methodology concerning verification	\vdash
ı		1		of the system / product compliance with requirements - Onboard navigational	492
\bot		1		systems and components.	oxdot
,		1		Flaws in manufacturer quality control process - Onboard navigational systems and	493
i		+		components. Unintuitive and / or error prone system manual - FMS	494
	1	+		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	
'		1		or / and passive contribution to the PF duties	151
3				Pilot tiredness - Inadequate workload distribution	167
)				Flaws in pilot requirements definition process and/or training methodology	168
)		1		Lack of adherence to SOP in terms of approach and landing	245
!	+	+	<u> </u>	Flaws in CRM training procedures	263 264
1	1	+		Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates	304
38	Imminent CFIT at decision height	AL35C3	An imminent CFIT occurs when aircraft is at decision height	Natural or artificial obstacle on runway course	60
			0	Pilot tiredness - Inadequate workload distribution	167
				Flaws in pilot requirements definition process and/or training methodology	168
				I selvet adherence to COD in terms of annually and leading	245
				Lack of adherence to SOP in terms of approach and landing	
				Premature descent to DA(H) before G/S intercept or premature descent to MDA(H)	
				Premature descent to DA(H) before G/S intercept or premature descent to MDA(H) before final-descent-point / FAF	281
				Premature descent to DA(H) before G/S intercept or premature descent to MDA(H) before final-descent-point / FAF Adverse weather / poor visibility conditions / darkness	281 6
				Premature descent to DA(H) before G/S intercept or premature descent to MDA(H) before final-descent-point / FAF	281
				Premature descent to DA(H) before G/S intercept or premature descent to MDA(H) before final-descent-point / FAF Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby	281 6
				Premature descent to DA(H) before G/S intercept or premature descent to MDA(H) before final-descent-point / FAF Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning	281 6 26 50 51
				Premature descent to DA(H) before G/S intercept or premature descent to MDA(H) before final-descent-point / FAF Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious)	281 6 26 50



		Base events	Code	Definition	Identifiable precursors	No.
13					Inadequate NOTAM information concerning ground navigational aid failure	68
14 15					Inadequate navigational chart Lack of English proficiency	69 132
П					Lack of adherence to SOP during aircraft storage and / or maintenance in terms of	
16					protecting of critical aircraft systems against contamination	233
17 18			-		Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution	134 137
П					Flaws in traffic controller requirements definition process and/or training	
19					methodology	145
20					Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	146
21					driver	148
22					Flaws in maintenance technician / airworthiness specialist requirements definition	149
Н					process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	
23					distribution	150
24					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151
25			-		or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes	155
26					Pilot tiredness - Inadequate workload distribution	167
27					Flaws in pilot requirements definition process and/or training methodology	168
28			-		Lack of adherence to the SOP in terms of critical indicators cross-checking Lack of adherence to SARPs included in Annex 14 and related documents in terms of	224
29					RWY parameters and location, attitude, approach path parameters and obstacles	225
Ш					locations (e.g. mountains).	Ш
30 32					Lack of adherence to SOP in terms of approach and landing	245 269
33					Incorrect use of automation - FMS Altimeter setting error	269
34					Failure to check navigation accuracy before approach	275
25					Inadequate certification process and / or flaws in methodology concerning verification	
35					of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299
36					Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting	303
30					systems warning. Navigational aid failure.	303
37					Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)	306
					Lack of adherence to SOP for AIR operations in terms of controller error in approach	207
38					clearence instruction	307
39					Not recognized ground Navaids System failure not reflected in NOTAM messages Flaws in aircraft system maintenance process definition - FMS subsystems and	308
40					components (autopilot incl.)	410
41					Flaws in aircraft system maintenance process definition - Ground navigational systems	488
					and components (e.g. ILS)	\perp
42					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground navigational systems	
					and components (e.g. ILS)	
43					Flaws in manufacturer quality control process - Ground navigational systems and	490
Н					components (e.g. ILS) Flaws in aircraft system maintenance process definition - Onboard navigational	\vdash
44					systems and components	491
П					Inadequate certification process and / or flaws in methodology concerning verification	
45					of the system / product compliance with requirements - Onboard navigational systems and components.	492
					Flaws in manufacturer quality control process - Onboard navigational systems and	400
46					components.	493
47					Unintuitive and / or error prone system manual - FMS Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	494
48					or / and passive contribution to the PF duties	151
49					Pilot tiredness - Inadequate workload distribution	167
50					Flaws in pilot requirements definition process and/or training methodology	168
51 52					Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures	245 263
53					Lack of adherence to the main CRM rules	264
54					Imbalanced and inaproppriate relation between cpt and his subordinates	304
1		Unsuccessful missed approach procedure	AL35B22A	Given an imminent CFIT below DH, flight crew fail to avoid an imminent CFIT by making a missed approach.	Natural or artificial obstacle on runway course	60
2				a moded approach.	Pilot tiredness - Inadequate workload distribution	167
3					Flaws in pilot requirements definition process and/or training methodology	168
4 5					Premature descent below MDA(H) before reaching the visual-descent-point (VDP) Flight below desired flight path during initial and/or final approach	282 283
6					Failure to go-around, when so required	289
7					Failure to follow published missed-approach procedure	291
8					Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby	6
9					instruments / displays or standay	26
10					GPWS / TAWS alert / warning (genuine or spurious)	50
11 12					MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s)	51 53
12					Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS	61
14					Ground Navigational Aid failure	62
	1				Inadequate NOTAM information concerning ground navigational aid failure	68
15			1		Inadequate navigational chart Lack of English proficiency	69 132
15 16 17					Lack of adherence to SOP during aircraft storage and / or maintenance in terms of	222
15 16 17 18					protecting of critical aircraft systems against contamination	233
15 16 17 18					protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller	134
15 16 17 18 19 20					protecting of critical aircraft systems against contamination	134 137
15 16 17 18 19 20 21					protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology	134 137 145
15 16 17 18 19 20					protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training	134 137



		Base events	Code	Definition	Identifiable precursors	No.
24					Flaws in maintenance technician / airworthiness specialist requirements definition	149
					process and/or training methodology	143
25					Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150
\dashv					distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	+
26					or / and passive contribution to the PF duties	151
27					Current airport diagram not reflecting critical changes	155
28					Pilot tiredness - Inadequate workload distribution	167
29					Flaws in pilot requirements definition process and/or training methodology	168
30					Lack of adherence to the SOP in terms of critical indicators cross-checking Lack of adherence to SARPs included in Annex 14 and related documents in terms of	224
31					RWY parameters and location, attitude, approach path parameters and obstacles	225
					locations (e.g. mountains).	
32					Lack of adherence to SOP in terms of approach and landing	245
34					Incorrect use of automation - FMS	269
35 36					Altimeter setting error	274 275
30					Failure to check navigation accuracy before approach Inadequate certification process and / or flaws in methodology concerning verification	-
37					of the system / product compliance with requirements - FMS subsystems and	299
\dashv					components (autopilot incl.)	-
38					Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting	303
\dashv					systems warning. Navigational aid failure. Flaws in manufacturer quality control process - FMS subsystem and components	+
39					(autopilot incl.)	306
40					Lack of adherence to SOP for AIR operations in terms of controller error in approach clearence instruction	307
41					Not recognized ground Navaids System failure not reflected in NOTAM messages	308
					Flaws in aircraft system maintenance process definition - FMS subsystems and	410
42					components (autopilot incl.)	
43					Flaws in aircraft system maintenance process definition - Ground navigational systems	488
			-		and components (e.g. ILS)	
44					Inadequate certification process and / or flaws in methodology concerning verification	
44					of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS)	489
					Flaws in manufacturer quality control process - Ground navigational systems and	
45					components (e.g. ILS)	490
46					Flaws in aircraft system maintenance process definition - Onboard navigational	491
-10					systems and components	
47					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492
48					Flaws in manufacturer quality control process - Onboard navigational systems and	493
49					components. Unintuitive and / or error prone system manual - FMS	494
50					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	
\Box					or / and passive contribution to the PF duties	
51 52					Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168
53					Lack of adherence to SOP in terms of approach and landing	245
54					Flaws in CRM training procedures	263
55			ĺ		Lack of adherence to the main CRM rules	
						264
56					Imbalanced and inaproppriate relation between cpt and his subordinates	304
56	40	No terminal area radar (TAR) available	AL35B31	Given a Controlled Flight Towards Terrain (CFTT), the aircraft	Imbalanced and inaproppriate relation between cpt and his subordinates Natural or artificial obstacle on runway course	
1 4	40	No terminal area radar (TAR) available	AL35B31	Given a Controlled Flight Towards Terrain (CFTT), the aircraft location is not covered by ATC with terminal area radar (TAR).	Natural or artificial obstacle on runway course	304 60
56 1 2	40	No terminal area radar (TAR) available	AL35B31	I	Natural or artificial obstacle on runway course Traffic controller tiredness - Inadequate workload distribution	304 60 137
56 1	40	No terminal area radar (TAR) available	AL35B31	I	Natural or artificial obstacle on runway course	304 60
56 1 2	40	No terminal area radar (TAR) available	AL35B31	I	Natural or artificial obstacle on runway course Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high	304 60 137 145
56 1 2 3 4	40	No terminal area radar (TAR) available	AL35B31	I	Natural or artificial obstacle on runway course Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain)	304 60 137 145 278
56 1 2 3	40	No terminal area radar (TAR) available	AL35B31	I	Natural or artificial obstacle on runway course Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain) Continued approach, when below DA(H) or MDA(H), after loss of visual references	304 60 137 145 278 284
56 1 4 2 3 4 5	40	No terminal area radar (TAR) available	AL35B31	I	Natural or artificial obstacle on runway course Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain)	304 60 137 145 278 284 6
56 1 4 2 3 4 5 6 7	40	No terminal area radar (TAR) available	AL35B31	I	Natural or artificial obstacle on runway course Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain) Continued approach, when below DA(H) or MDA(H), after loss of visual references Adverse weather // poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments	304 60 137 145 278 284 6 26
56 1 4 2 3 3 4 5 6 7 8 8	40	No terminal area radar (TAR) available	AL35B31	I	Natural or artificial obstacle on runway course Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain) Continued approach, when below DA(H) or MDA(H), after loss of visual references Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious)	304 60 137 145 278 284 6 26 50
56 1 4 2 3 3 4 5 6 7 8 9 9	40	No terminal area radar (TAR) available	AL35B31	I	Natural or artificial obstacle on runway course Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain) Continued approach, when below DA(H) or MDA(H), after loss of visual references Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning	304 60 137 145 278 284 6 26 50 51
56 1 4 2 3 3 4 5 6 7 8 9 10 10	40	No terminal area radar (TAR) available	AL35B31	I	Natural or artificial obstacle on runway course Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain) Continued approach, when below DA(H) or MDA(H), after loss of visual references Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s)	304 60 137 145 278 284 6 26 50 51 53
56 1 4 2 3 4 5 6 7 8 9 10 11 1	40	No terminal area radar (TAR) available	AL35B31	I	Natural or artificial obstacle on runway course Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain) Continued approach, when below DA(H) or MDA(H), after loss of visual references Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning	304 60 137 145 278 284 6 26 50 51
56 1 4 2 3 3 4 5 6 7 8 9 10 11 12 12 12 12 12 12	40	No terminal area radar (TAR) available	AL35B31	I	Natural or artificial obstacle on runway course Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain) Continued approach, when below DA(H) or MDA(H), after loss of visual references Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS	304 60 137 145 278 284 6 26 50 51 53 61
56 1 4 2 3 3 4 5 6 6 7 8 9 10 11 12 13 14 14 14 14 14 14 14	40	No terminal area radar (TAR) available	AL35B31	I	Natural or artificial obstacle on runway course Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain) Continued approach, when below DA(H) or MDA(H), after loss of visual references Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart	304 60 137 145 278 284 6 26 50 51 53 61 62 68 69
56 1 4 2 3 3 4 5 6 6 7 8 9 10 11 12 13 14 14 14 14 14 14 14	40	No terminal area radar (TAR) available	AL35B31	I	Natural or artificial obstacle on runway course Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain) Continued approach, when below DA(H) or MDA(H), after loss of visual references Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Ald failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency	304 60 137 145 278 284 6 26 50 51 53 61 62 68
56 1 4 2 3 3 4 5 6 6 7 8 9 10 11 12 13 14 14 14 14 14 14 14	40	No terminal area radar (TAR) available	AL35B31	I	Natural or artificial obstacle on runway course Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain) Continued approach, when below DA(H) or MDA(H), after loss of visual references Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational I diallure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of	304 60 137 145 278 284 6 26 50 51 53 61 62 68 69
56 1 4 2 3 4 5 6 6 7 8 9 10 11 12 13 14 15 16 6	440	No terminal area radar (TAR) available	AL35B31	I	Natural or artificial obstacle on runway course Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain) Continued approach, when below DA(H) or MDA(H), after loss of visual references Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination	304 60 137 145 278 284 6 26 50 51 53 61 62 68 69 132
56	440	No terminal area radar (TAR) available	AL35B31	I	Natural or artificial obstacle on runway course Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain) Continued approach, when below DA(H) or MDA(H), after loss of visual references Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational I diallure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of	304 60 137 145 278 284 6 50 51 53 61 62 68 69 132
56 1 4 2 3 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18	440	No terminal area radar (TAR) available	AL35B31	I	Natural or artificial obstacle on runway course Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain) Continued approach, when below DA(H) or MDA(H), after loss of visual references Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller	304 60 137 145 278 284 6 26 50 51 53 61 62 68 69 132 233 134 137
56 1 4 2 3 3 4 5 6 7 8 9 10 11 12 13 14 15 16 16 17 18 19	410	No terminal area radar (TAR) available	AL35B31	I	Natural or artificial obstacle on runway course Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain) Continued approach, when below DA(H) or MDA(H), after loss of visual references Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology	304 60 137 145 278 284 6 26 50 51 53 61 62 68 69 132 233 134 137
56 1 4 2 3 3 4 5 6 6 7 8 9 10 11 12 13 14 15 16 17 18 19 19	440	No terminal area radar (TAR) available	AL35B31	I	Natural or artificial obstacle on runway course Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain) Continued approach, when below DA(H) or MDA(H), after loss of visual references Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller requirements definition process and/or training methodology Lack of or poor communication quality	304 60 137 145 278 284 6 26 50 51 53 61 62 68 69 132 233 134 137
56 1 4 2 3 3 4 5 6 6 7 8 9 10 11 12 13 14 15 16 17 18 19 19	440	No terminal area radar (TAR) available	AL35B31	I	Natural or artificial obstacle on runway course Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain) Continued approach, when below DA(H) or MDA(H), after loss of visual references Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of or opoor communication quality Lack of or datherence to SOP in terms of communication between ATC and pilot / vehicle	304 60 137 145 278 284 6 26 50 51 53 61 62 68 69 132 233 134 137
56 1 4 2 3 3 4 4 5 6 7 7 8 9 9 10 11 12 13 14 15 16 17 18 19 20 20 21	440	No terminal area radar (TAR) available	AL35B31	I	Natural or artificial obstacle on runway course Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain) Continued approach, when below DA(H) or MDA(H), after loss of visual references Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller requirements definition process and/or training methodology Lack of or poor communication quality	304 60 137 145 278 284 6 26 50 51 53 61 62 233 134 137 145 146
56 1 4 2 3 3 4 5 6 7 7 8 9 10 11 12 13 14 15 16 17 18 19 20 1	440	No terminal area radar (TAR) available	AL35B31	I	Natural or artificial obstacle on runway course Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain) Continued approach, when below DA(H) or MDA(H), after loss of visual references Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	304 60 137 145 278 284 6 26 50 51 53 61 62 68 69 132 233 134 137 145
56 1 4 2 3 3 4 4 5 6 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	440	No terminal area radar (TAR) available	AL35B31	I	Natural or artificial obstacle on runway course Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain) Continued approach, when below DA(H) or MDA(H), after loss of visual references Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist trequirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - inadequate workload	304 60 137 145 278 284 6 26 50 51 53 61 62 233 134 137 145 146
56 1 4 4 5 6 7 7 8 9 10 11 15 16 17 18 19 20 21 11 11 11 11 11 11	440	No terminal area radar (TAR) available	AL35B31	I	Natural or artificial obstacle on runway course Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain) Continued approach, when below DA(H) or MDA(H), after loss of visual references Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Ald failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	304 60 137 145 278 284 6 50 51 53 61 62 68 69 132 233 134 137 145 146 148
56 1 4 4 5 6 6 7 7 8 9 10 11 11 12 13 14 15 16 17 18 19 20 21 22	440	No terminal area radar (TAR) available	AL35B31	I	Natural or artificial obstacle on runway course Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain) Continued approach, when below DA(H) or MDA(H), after loss of visual references Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist trequirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to SOP in terms of PNF flight parameters / situation monitoring	304 60 137 145 278 284 6 26 50 51 53 61 62 233 134 137 145 146 148
56 1 4 7 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 5	440	No terminal area radar (TAR) available	AL35B31	I	Natural or artificial obstacle on runway course Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain) Continued approach, when below DA(H) or MDA(H), after loss of visual references Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Ald failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	304 60 137 145 278 284 6 50 51 62 68 69 132 233 134 137 145 146 148 149 150
56 1 4 7 7 8 9 7 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 6	440	No terminal area radar (TAR) available	AL35B31	I	Natural or artificial obstacle on runway course Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain) Continued approach, when below DA(H) or MDA(H), after loss of visual references Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of or poor communication a inworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution	304 60 137 145 278 284 6 26 50 51 61 62 68 69 132 233 134 145 146 148 149 150 151
56 1 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25	40	No terminal area radar (TAR) available	AL35B31	I	Natural or artificial obstacle on runway course Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain) Continued approach, when below DA(H) or MDA(H), after loss of visual references Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Ald failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes	304 60 137 145 278 284 6 50 51 62 68 69 132 233 134 137 145 146 148 149 150



г	l	Base events	Code	Definition	Identifiable precursors Lack of adherence to SARPs included in Annex 14 and related documents in terms of	No.
29					RWY parameters and location, attitude, approach path parameters and obstacles	225
					locations (e.g. mountains).	
30					Lack of adherence to SOP in terms of approach and landing	245
32					Incorrect use of automation - FMS	269
33 34					Altimeter setting error Failure to check navigation accuracy before approach	274
34					Inadequate certification process and / or flaws in methodology concerning verification	275
35					of the system / product compliance with requirements - FMS subsystems and	299
33					components (autopilot incl.)	233
					Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting	
36					systems warning. Navigational aid failure.	303
37					Flaws in manufacturer quality control process - FMS subsystem and components	306
J,					(autopilot incl.)	300
38					Lack of adherence to SOP for AIR operations in terms of controller error in approach	307
39					clearence instruction Not recognized ground Navaids System failure not reflected in NOTAM messages	308
Н					Flaws in aircraft system maintenance process definition - FMS subsystems and	
40					components (autopilot incl.)	410
Ι					Flaws in aircraft system maintenance process definition - Ground navigational systems	488
41					and components (e.g. ILS)	488
					Inadequate certification process and / or flaws in methodology concerning verification	
42					of the system / product compliance with requirements - Ground navigational systems	489
_					and components (e.g. ILS)	-
43					Flaws in manufacturer quality control process - Ground navigational systems and	490
\vdash					components (e.g. ILS) Flaws in aircraft system maintenance process definition - Onboard navigational	\vdash
44					systems and components	491
Т					Inadequate certification process and / or flaws in methodology concerning verification	,
45					of the system / product compliance with requirements - Onboard navigational	492
L					systems and components.	\perp
46					Flaws in manufacturer quality control process - Onboard navigational systems and	493
ᆫ					components.	
47					Unintuitive and / or error prone system manual - FMS	494
48					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151
49					or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution	167
50					Flaws in pilot requirements definition process and/or training methodology	168
51					Lack of adherence to SOP in terms of approach and landing	245
52					Flaws in CRM training procedures	263
53					Lack of adherence to the main CRM rules	264
54					Imbalanced and inaproppriate relation between cpt and his subordinates	304
1	41	Unsuccessful ATCO monitoring of TAR	AL35B321	Given a CFTT with TAR available, ATCO fails to detect in time to be	Traffic controller tiredness - Inadequate workload distribution	137
H				able to prevent an imminent CFIT.		\vdash
2					Flaws in traffic controller requirements definition process and/or training methodology	145
3						
_	l .					6
ı –					Adverse weather / poor visibility conditions / darkness	6
4						6 26
5					Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby	26 50
5					Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning	26 50 51
5 6 7					Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby Instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s)	26 50 51 53
5 6 7 8					Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS	26 50 51 53 61
5 6 7 8					Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby Instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure	26 50 51 53 61 62
5 6 7 8 9					Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure	26 50 51 53 61 62 68
5 6 7 8					Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart	26 50 51 53 61 62 68 69
5 6 7 8 9 10 11					Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure	26 50 51 53 61 62 68 69 132
5 6 7 8 9 10 11 12					Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate noVTAM information concerning ground navigational aid failure Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination	26 50 51 53 61 62 68 69 132 233
5 6 7 8 9 10 11 12 13					Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller	26 50 51 53 61 62 68 69 132 233
5 6 7 8 9 10 11 12					Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution	26 50 51 53 61 62 68 69 132 233
5 6 7 8 9 10 11 12 13					Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate noVTAM information concerning ground navigational aid failure Inadequate of English proficiency Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training	26 50 51 53 61 62 68 69 132 233
5 6 7 8 9 10 11 12 13 14 15					Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology	26 50 51 53 61 62 68 69 132 233 134 137
5 6 7 8 9 10 11 12 13 14 15 16					Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPMS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training menthodology Lack of or poor communication quality	26 50 51 53 61 62 68 69 132 233 134 137 145
5 6 7 8 9 10 11 12 13 14 15					Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology	26 50 51 53 61 62 68 69 132 233 134 137 145
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5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20					Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of english proficiency Lack of of officiency Itaking of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	26 50 51 53 61 62 68 69 132 233 134 137 145 146 148 149 150
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	42						493



		Base events	Code	Definition	Identifiable precursors	No.
44					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151
45					or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution	167
46					Flaws in pilot requirements definition process and/or training methodology	168
47					Lack of adherence to SOP in terms of approach and landing	245
48 49					Flaws in CRM training procedures Lack of adherence to the main CRM rules	263 264
50					Imbalanced and inaproppriate relation between cpt and his subordinates	304
	43	MSAW failure to give warning in time	AL35B3222	Given a CFTT with TAR and MSAW available, MSAW does not give a	Inadequate certification process and / or flaws in methodology concerning verification	411
2				warning in time to be able to prevent an imminent CFIT.	of the system / product compliance with requirements - MSAW System	6
					Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby	
3					instruments	26
5					GPWS / TAWS alert / warning (genuine or spurious)	50
6					MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s)	51 53
7					Error in preparation of database for FMS	61
8					Ground Navigational Aid failure	62
10					Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart	68 69
11					Lack of English proficiency	132
12					Lack of adherence to SOP during aircraft storage and / or maintenance in terms of	233
13					protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller	134
14					Traffic controller tiredness - Inadequate workload distribution	137
15					Flaws in traffic controller requirements definition process and/or training	145
16					methodology Lack of or poor communication quality	146
					Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	1
17					driver	148
18					Flaws in maintenance technician / airworthiness specialist requirements definition	149
Н					process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	+-
19					distribution	150
20					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151
21					or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes	155
22					Pilot tiredness - Inadequate workload distribution	167
23					Flaws in pilot requirements definition process and/or training methodology	168
24					Lack of adherence to the SOP in terms of critical indicators cross-checking Lack of adherence to SARPs included in Annex 14 and related documents in terms of	224
25					RWY parameters and location, attitude, approach path parameters and obstacles	225
					locations (e.g. mountains).	
26 28					Lack of adherence to SOP in terms of approach and landing Incorrect use of automation - FMS	245 269
29					Altimeter setting error	274
30					Failure to check navigation accuracy before approach	275
31					Inadequate certification process and / or flaws in methodology concerning verification	
31					of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299
32					Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting	303
32					systems warning. Navigational aid failure.	303
33					Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)	306
24					Lack of adherence to SOP for AIR operations in terms of controller error in approach	307
34					clearence instruction	_
35					Not recognized ground Navaids System failure not reflected in NOTAM messages Flaws in aircraft system maintenance process definition - FMS subsystems and	308
36					components (autopilot incl.)	410
37					Flaws in aircraft system maintenance process definition - Ground navigational systems	488
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38					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground navigational systems	
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40					systems and components	491
41					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational	1 492
Ц					systems and components.	
42					Flaws in manufacturer quality control process - Onboard navigational systems and components.	493
43					Unintuitive and / or error prone system manual - FMS	494
44					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151
45					or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution	167
46					Flaws in pilot requirements definition process and/or training methodology	168
47					Lack of adherence to SOP in terms of approach and landing	245
48					Flaws in CRM training procedures	263
49 50					Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates	264 304
	44	ATCO failure to respond to MSAW	AL35B3223	Given a CFTT with MSAW warning, ATCO does not respond in time	MSAW warning	51
	-1-1	warning	ML3303443	to be able to prevent an imminent CFIT.	-	
2			-		Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training	137
3					methodology	145
L			T T		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting	405
4						495
					systems warning. MSAW warning.	
4 5 6					systems warning. MSAW warning. Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby	6 26



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21					Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	148
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22					Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
23					Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150
23					distribution	
24					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
25					Current airport diagram not reflecting critical changes	155
26					Pilot tiredness - Inadequate workload distribution	167
27 28					Flaws in pilot requirements definition process and/or training methodology Lack of adherence to the SOP in terms of critical indicators cross-checking	168 224
-					Lack of adherence to SARPs included in Annex 14 and related documents in terms of	
29					RWY parameters and location, attitude, approach path parameters and obstacles	225
30					locations (e.g. mountains). Lack of adherence to SOP in terms of approach and landing	245
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37					Flaws in manufacturer quality control process - FMS subsystem and components	306
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48 49 50 51 52 53 54 IV +III +II	IV 46	GPWS failure GPWS not installed	AL35B11	Given an imminent CFIT, the aircraft is not fitted with GPWS.	components. Unintuitive and / or error prone system manual - FMS Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates GPWS failure Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS	494 151 167 168 245 263 264 304
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48 49 50 51 52 53 54 IV +III +II			AL35B11	Given an imminent CFIT, the aircraft is not fitted with GPWS.	components. Unintuitive and / or error prone system manual - FMS Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates GPWS failure Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS	494 151 167 168 245 263 264 304
48 49 50 51 52 53 54 IV +III +I 1 2 3			AL35B11	Given an imminent CFIT, the aircraft is not fitted with GPWS.	components. Unintuitive and / or error prone system manual - FMS Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates GPWS failure Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious)	494 151 167 168 245 263 264 304 293 6
48 49 50 51 52 53 54 IV +III +I 1 2 3 4			AL35811	Given an imminent CFIT, the aircraft is not fitted with GPWS.	components. Unintuitive and / or error prone system manual - FMS Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates GPWS failure Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning	494 151 167 168 245 263 264 304 293 6 26 26 50
48 49 50 51 52 53 54 IV +III +I 1 2 3			AL35811	Given an imminent CFIT, the aircraft is not fitted with GPWS.	components. Unintuitive and / or error prone system manual - FMS Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates GPWS failure Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious)	494 151 167 168 245 263 264 304 293 6
48 49 50 51 52 53 54 IV +III + II 2 3 4 5 6 7 8			AL35B11	Given an imminent CFIT, the aircraft is not fitted with GPWS.	Components. Unintuitive and / or error prone system manual - FMS Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates GPWS failure Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure	494 151 167 168 245 263 264 304 293 6 26 50 51 53 61 62
48 49 50 51 52 53 54 IV +III +I 1 2 3 4 5 6 7 8 9			AL35B11	Given an imminent CFIT, the aircraft is not fitted with GPWS.	components. Unintuitive and / or error prone system manual - FMS Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates GPWS failure Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure	494 151 167 168 245 263 264 304 293 6 26 50 51 53 61 62 68
48 49 50 51 52 53 54 IV +III + II 2 3 4 5 6 7 8			AL35B11	Given an imminent CFIT, the aircraft is not fitted with GPWS.	Components. Unintuitive and / or error prone system manual - FMS Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates GPWS failure Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure	494 151 167 168 245 263 264 304 293 6 26 50 51 53 61 62
48 49 50 51 52 53 54 IV +III +I 1 2 3 4 5 6 7 8 9 10			AL35811	Given an imminent CFIT, the aircraft is not fitted with GPWS.	components. Unintuitive and / or error prone system manual - FMS Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates GPWS failure Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of English proficiency	494 151 167 168 245 263 264 304 293 6 26 50 51 53 61 62 68 69
48 49 50 51 52 53 54 IV +III +II 1 2 3 4 5 6 7 8 9 10 11 12			AL35811	Given an imminent CFIT, the aircraft is not fitted with GPWS.	Components. Unintuitive and / or error prone system manual - FMS Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates GPWS failure Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of English proficiency	494 151 167 168 245 263 264 304 293 6 26 50 50 51 53 61 62 68 69 132 233
48 49 50 51 52 53 54 IV +III +I 1 2 3 4 5 6 7 8 9 10 11			AL35811	Given an imminent CFIT, the aircraft is not fitted with GPWS.	components. Unintuitive and / or error prone system manual - FMS Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates GPWS failure Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution	494 151 167 168 245 263 264 304 293 6 26 50 51 53 61 62 68 69 132
48 49 50 51 52 53 54 IV +III +II 1 2 3 4 5 6 7 8 9 10 11 12			AL35B11	Given an imminent CFIT, the aircraft is not fitted with GPWS.	Components. Unintuitive and / or error prone system manual - FMS Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates GPWS failure Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate NOTAM information concerning ground navigational aid failure Lack of English proficiency Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training	494 151 167 168 2245 263 264 304 293 6 26 50 51 53 62 68 69 132 233
48 49 50 51 52 53 54 IV +III +I 2 3 4 5 6 7 8 9 10 11 12 13 14			AL35B11	Given an imminent CFIT, the aircraft is not fitted with GPWS.	Components. Unintuitive and / or error prone system manual - FMS Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates GPWS failure Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology	293 6 264 265 263 264 304 293 6 26 50 51 62 68 69 132 233 134 137
48 49 50 51 52 53 1V +III +I 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16			AL35811	Given an imminent CFIT, the aircraft is not fitted with GPWS.	Components. Unintuitive and / or error prone system manual - FMS Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates GPWS failure Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate NOTAM information concerning ground navigational aid failure Lack of English proficiency Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training	293 6 264 50 50 50 51 53 68 69 132 233 134 137 145
48 49 50 51 52 53 54 11 11 2 3 4 5 6 7 8 9 10 11 12 13 14			AL35811	Given an imminent CFIT, the aircraft is not fitted with GPWS.	Components. Unintuitive and / or error prone system manual - FMS Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates GPWS failure Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller triedness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	293 6 264 265 263 264 304 293 6 26 50 51 62 68 69 132 233 134 137
48 49 50 51 52 53 1V +III +I 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16			AL35811	Given an imminent CFIT, the aircraft is not fitted with GPWS.	Components. Unintuitive and / or error prone system manual - FMS Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates GPWS failure Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller requirements definition process and/or training methodology Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition	293 6 264 50 50 50 51 53 68 69 132 233 134 137 145
48 49 50 51 52 53 54 IV HIII 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18			AL35B11	Given an imminent CFIT, the aircraft is not fitted with GPWS.	Components. Unintuitive and / or error prone system manual - FMS Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates GPWS failure Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller triedness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	293 6 264 304 293 6 26 26 304 293 6 26 50 51 53 61 62 233 134 137 145 146
48 49 50 51 52 53 54 IV +III +II 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17			AL35B11	Given an imminent CFIT, the aircraft is not fitted with GPWS.	Components. Unintuitive and / or error prone system manual - FMS Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates GPWS failure Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate NOTAM information concerning ground navigational aid failure Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller requirements definition process and/or training methodology Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist trequirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	494 151 167 168 245 263 264 304 293 6 26 50 51 53 61 62 68 69 132 233 134 137 145 146 148
48 49 50 51 52 53 54 IV +III 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17			AL35811	Given an imminent CFIT, the aircraft is not fitted with GPWS.	Components. Unintuitive and / or error prone system manual - FMS Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot triedness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates GPWS failure Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate NOTAM information concerning ground navigational aid failure Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tredness - Inadequate workload distribution Lack of adherence to SOP in terms of PNF flight parameters / situation monitoring Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	494 151 167 168 245 263 264 304 293 6 26 50 51 53 61 62 68 69 132 233 134 137 145 146 148
48 49 50 51 52 53 54 IV HIII 1 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19			AL35811	Given an imminent CFIT, the aircraft is not fitted with GPWS.	Components. Unintuitive and / or error prone system manual - FMS Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates GPWS failure Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist tredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes	293 6 26 50 69 132 133 134 145 148 149 155
48 49 50 51 52 53 54 IV HIII 1 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19			AL35B11	Given an imminent CFIT, the aircraft is not fitted with GPWS.	Components. Unintuitive and / or error prone system manual - FMS Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates GPWS failure Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	293 6 26 50 51 145 145 245 304 263 264 304 293 6 26 50 51 53 61 62 233 134 137 145 146 148 149



		Base events	Code	Definition	Identifiable precursors	No.
24					Lack of adherence to the SOP in terms of critical indicators cross-checking	224
П					Lack of adherence to SARPs included in Annex 14 and related documents in terms of	\top
25					RWY parameters and location, attitude, approach path parameters and obstacles	225
					locations (e.g. mountains).	
26					Lack of adherence to SOP in terms of approach and landing	245
28					Incorrect use of automation - FMS	269
29					Altimeter setting error	274
30					Failure to check navigation accuracy before approach	275
					Inadequate certification process and / or flaws in methodology concerning verification	1
31					of the system / product compliance with requirements - FMS subsystems and	299
					components (autopilot incl.)	
32					Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting	303
32					systems warning. Navigational aid failure.	303
33					Flaws in manufacturer quality control process - FMS subsystem and components	306
33					(autopilot incl.)	300
34					Lack of adherence to SOP for AIR operations in terms of controller error in approach	307
ш					clearence instruction	_
35					Not recognized ground Navaids System failure not reflected in NOTAM messages	308
36					Flaws in aircraft system maintenance process definition - FMS subsystems and	410
Ш					components (autopilot incl.)	
37					Flaws in aircraft system maintenance process definition - Ground navigational systems	488
					and components (e.g. ILS)	_
					Inadequate certification process and / or flaws in methodology concerning verification	
38					of the system / product compliance with requirements - Ground navigational systems	489
Ш					and components (e.g. ILS)	₩
39					Flaws in manufacturer quality control process - Ground navigational systems and	490
Щ					components (e.g. ILS)	+
40					Flaws in aircraft system maintenance process definition - Onboard navigational	491
Н					systems and components	
					Inadequate certification process and / or flaws in methodology concerning verification	
41					of the system / product compliance with requirements - Onboard navigational	492
Щ					systems and components.	₩
42					Flaws in manufacturer quality control process - Onboard navigational systems and	493
Ш					components.	₩
43					Unintuitive and / or error prone system manual - FMS	494
44					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151
Ш					or / and passive contribution to the PF duties	
45					Pilot tiredness - Inadequate workload distribution	167
46					Flaws in pilot requirements definition process and/or training methodology	168
47					Lack of adherence to SOP in terms of approach and landing	245
48					Flaws in CRM training procedures	263
49					Lack of adherence to the main CRM rules	264
50					Imbalanced and inaproppriate relation between cpt and his subordinates	304
51					Adverse weather / poor visibility conditions / darkness	6
52					MSAW warning	51
53					Natural or artificial obstacle on runway course	60
54					Traffic controller tiredness - Inadequate workload distribution	137
55					Flaws in traffic controller requirements definition process and/or training	145
33					methodology	_
56					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151
					or / and passive contribution to the PF duties	
57					Pilot tiredness - Inadequate workload distribution	167
58					Flaws in pilot requirements definition process and/or training methodology	168
59					Lack of adherence to SOP in terms of approach and landing	245
60					Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high	278
-00					terrain)	270
61					Premature descent to DA(H) before G/S intercept or premature descent to MDA(H)	281
ш					before final-descent-point / FAF	
62					Premature descent below MDA(H) before reaching the visual-descent-point (VDP)	282
63					Flight below desired flight path during initial and/or final approach	283
64					Continued approach, when below DA(H) or MDA(H), after loss of visual references	284
65					Late or inadequate response to MSAW warning	286
66					Failure to go-around, when so required	289
67					Failure to follow published missed-approach procedure	291
68					Lack of adherence to SARPs included in Annex 14 and related documents in terms of	295
Щ					RWY parameters and location, approach path parameters and obstacles locations.	+
69					Lack of adherence to the current technology standards in terms of flight safety	302
Ш					supporting systems. Lack of MSAW system.	
70					Inadequate certification process and / or flaws in methodology concerning verification	411
Н					of the system / product compliance with requirements - MSAW System	₩
71					Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting	495
Н					systems warning. MSAW warning.	+
		l.,	l	Given an imminent CFIT on an aircraft fitted with GPWS, the GPWS	Flaws in maintenance technician / airworthiness specialist requirements definition	I.
1	47	No GPWS warning in time	AL35B12	does not give an appropriate warning in time for avoidance action.	process and/or training methodology	149
Ш				5		₩
2			1		Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150
Ш					distribution	_
3					Flaws in aircraft system maintenance process definition - GPWS system components	485
			1		Inadequate certification process and / or flaws in methodology concerning verification	d.
4					of the system / product compliance with requirements - GPWS system components	486
Щ						 -
					Flaws in manufacturer quality control process - GPWS system components	487
5					Adverse weather / poor visibility conditions / darkness	6
6			1		System failure affecting the operation of primary instruments / displays or standby	26
${}$			I		instruments	
6 7	_				GPWS / TAWS alert / warning (genuine or spurious)	50
6 7 8					GFW3/ TAW3 diett / Walting (genuine of spurious)	
6 7 8 9					MSAW warning	51
6 7 8 9						
6 7 8 9 10 11					MSAW warning	51 53 61
6 7 8 9 10 11					MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure	51 53 61 62
6 7 8 9 10 11					MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS	51 53 61



		Base events	Code	Definition	Identifiable precursors	No.
15					Lack of English proficiency	132
16					Lack of adherence to SOP during aircraft storage and / or maintenance in terms of	233
17					protecting of critical aircraft systems against contamination	134
18					Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution	134
\neg					Flaws in traffic controller requirements definition process and/or training	
19					methodology	145
20					Lack of or poor communication quality	146
21					Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	148
21					driver	140
22					Flaws in maintenance technician / airworthiness specialist requirements definition	149
					process and/or training methodology	
23					Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150
\vdash					distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	╀
24					or / and passive contribution to the PF duties	151
25			1		Current airport diagram not reflecting critical changes	155
26					Pilot tiredness - Inadequate workload distribution	167
27					Flaws in pilot requirements definition process and/or training methodology	168
28					Lack of adherence to the SOP in terms of critical indicators cross-checking	224
					Lack of adherence to SARPs included in Annex 14 and related documents in terms of	Т
29					RWY parameters and location, attitude, approach path parameters and obstacles	225
_					locations (e.g. mountains).	
30					Lack of adherence to SOP in terms of approach and landing	245
32					Incorrect use of automation - FMS	269
33					Altimeter setting error	274
34			 		Failure to check navigation accuracy before approach	275
25					Inadequate certification process and / or flaws in methodology concerning verification	
35			1		of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299
Н			 		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting	+
36			1		systems warning. Navigational aid failure.	303
\vdash					Flaws in manufacturer quality control process - FMS subsystem and components	+
37					(autopilot incl.)	306
					Lack of adherence to SOP for AIR operations in terms of controller error in approach	307
38					clearence instruction	307
39					Not recognized ground Navaids System failure not reflected in NOTAM messages	308
40					Flaws in aircraft system maintenance process definition - FMS subsystems and	410
40					components (autopilot incl.)	
41					Flaws in aircraft system maintenance process definition - Ground navigational systems	488
Ш					and components (e.g. ILS)	
					Inadequate certification process and / or flaws in methodology concerning verification	
42					of the system / product compliance with requirements - Ground navigational systems	489
Н					and components (e.g. ILS) Flaws in manufacturer quality control process - Ground navigational systems and	+
43					components (e.g. ILS)	490
Н			 		Flaws in aircraft system maintenance process definition - Onboard navigational	+
44					systems and components	491
П					Inadequate certification process and / or flaws in methodology concerning verification	,
45					of the system / product compliance with requirements - Onboard navigational	492
					systems and components.	
46					Flaws in manufacturer quality control process - Onboard navigational systems and	493
Ш					components.	
47					Unintuitive and / or error prone system manual - FMS	494
48					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151
40			-		or / and passive contribution to the PF duties	100
49 50			-		Pilot tiredness - Inadequate workload distribution	167
51			1		Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing	168 245
52	-		 		Flaws in CRM training procedures	263
53					Lack of adherence to the main CRM rules	264
54					Imbalanced and inaproppriate relation between cpt and his subordinates	304
55					Adverse weather / poor visibility conditions / darkness	6
56					MSAW warning	51
57					Natural or artificial obstacle on runway course	60
58					Traffic controller tiredness - Inadequate workload distribution	137
59					Flaws in traffic controller requirements definition process and/or training	145
					methodology	
60					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151
			-		or / and passive contribution to the PF duties	
61			 		Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167
62 63			 		Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing	168 245
			 		Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high	
64					terrain)	278
Н					Premature descent to DA(H) before G/S intercept or premature descent to MDA(H)	+
65			1		before final-descent-point / FAF	281
66					Premature descent below MDA(H) before reaching the visual-descent-point (VDP)	282
67					Flight below desired flight path during initial and/or final approach	283
68					Continued approach, when below DA(H) or MDA(H), after loss of visual references	284
69					Late or inadequate response to MSAW warning	286
					Failure to go-around, when so required	289
70					Failure to follow published missed-approach procedure	291
70 71			I		Lack of adherence to SARPs included in Annex 14 and related documents in terms of	295
71				l .	RWY parameters and location, approach path parameters and obstacles locations.	1
					the state of the s	
71					Lack of adherence to the current technology standards in terms of flight safety	302
71 72					supporting systems. Lack of MSAW system.	+
71 72					supporting systems. Lack of MSAW system. Inadequate certification process and / or flaws in methodology concerning verification	+
71 72 73					supporting systems. Lack of MSAW system.	



		Base event	Code	Definition Definition	Identifiable Precursors	No.
		Base event Incorrect presence of aircraft/vehicle	Code	Definition	Identifiable Precursors	No.
		on runway in use			Incorrect presence of aircraft/vehicle on runway in use	
1	1	Take-off instruction error by ATCO	TO32B611	ATCO gives inadequate take-off instructions to pilot, resulting in take-off while the runway is occupied	Lack of English proficiency	132
2				take on while the runnay is occupied	Incorrect or confusing / misleading ATC instructions	133
3					Use of non-standard phraseology by pilot and/or controller	134
4					Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot	137
5					spots	139
6					Flaws in traffic controller requirements definition process and/or training	145
7					methodology Callsign confusion	154
8					Current airport diagram not reflecting critical changes	155
9					Takeoff without clearance	157
10				ATCO fails to communicate take-off instructions to pilot, resulting in	Landing without clearance	158
1	2	Inadequate communication with pilot	TO32B612	take-off while the runway is occupied	Lack of English proficiency	132
2					Incorrect or confusing / misleading ATC instructions	133
3					Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution	134 137
					Lack of adherence to SOP for GND movements. Lack of awareness in terms of	143
,					sufficient separation / clearence	143
6					Flaws in traffic controller requirements definition process and/or training methodology	145
7					Lack of or poor communication quality	146
8					Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	148
_				ATCO fails to communicate the correct runway entry instructions	driver	1.0
1	3	Inadequate communication with pilot	TO32B412		Runway confusion	1
				causing a runway incursion		
2					Lack of English proficiency	132
3					Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller	133 134
5					Traffic controller tiredness - Inadequate workload distribution	137
6					Flaws in traffic controller requirements definition process and/or training	145
7					methodology Lack of or poor communication quality	146
8					Hearback ommitted	169
1	4	Pilot failure to follow taxi route	TO32B421	Pilots or vehicle driver fail to follow the correct taxi route to the	Taxiway confusion	7
2				runway entry point, causing a runway incursion	Lack of English proficiency	132
					Lack of adherence to SOP for GND movements. Lack of awareness of other traffic	
3					movements through listening of ATC communications	140
4					Lack of adherence to SOP for GND movements. Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	141
5					or / and passive contribution to the PF duties	151
6					Pilot tiredness - Inadequate workload distribution	167
7					Flaws in pilot requirements definition process and/or training methodology	168
8					Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129
_					Flaws in vehicle driver / equipment operator / ground agent requirements definition	130
9					process and/or training methodology	130
1		Pilot failure to follow runway entry instructions	TO32B422	Pilots or vehicle driver fail to follow the runway entry instruction from ATCO, causing a runway incursion	Lack of English proficiency	132
2		instructions		Tom Area, causing a ranway meansion	Pilot tiredness - Inadequate workload distribution	167
3					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151
4					or / and passive contribution to the PF duties Lack of adherence to SOP for GND movements.	141
5					Flaws in pilot requirements definition process and/or training methodology	
6					Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	168
_					distribution	129
7					Flaws in vehicle driver / equipment operator / ground agent requirements definition	
_		ATCO failure to recognise runway	TO328/1121	ATCO is not aware of a conflict on the runway and hence gives	Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	129 130
1		ATCO failure to recognise runway conflict	TO32B41121	ATCO is not aware of a conflict on the runway and hence gives runway entry instructions that cause a runway incursion	Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Runway confusion	129 130 1
_			TO32B41121		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Runway confusion Traffic controller tiredness - Inadequate workload distribution	129 130 1 137
1			TO32B41121		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Runway confusion Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	129 130 1
1			TO32B41121		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Runway confusion Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of awareness in terms of current	129 130 1 137
1			TO32B41121		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Runway confusion Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity	129 130 1 137 139 144
1			TO32B41121		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Runway confusion Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of awareness in terms of current	129 130 1 137 139
1 2 3 4			TO32B41121		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Runway confusion Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology Callsign confusion	129 130 1 137 139 144 145 154
1 2 3 4 5			TO32B41121		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Runway confusion Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology Callsign confusion Current airport diagram not reflecting critical changes	129 130 1 137 139 144 145 154 155
1 2 3 4			TO32B41121		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Runway confusion Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology Callsign confusion	129 130 1 137 139 144 145 154
1 2 3 4 5 6 7 8		conflict		runway entry instructions that cause a runway incursion ATCO is aware of a conflict but misjudges the runway separation	Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Runway confusion Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology Callsign confusion Current airport diagram not reflecting critical changes Takeoff without clearance Landing without clearance	129 130 1 137 139 144 145 154 155 157 158
1 2 3 4 5 6 7 8			TO32B41121	runway entry instructions that cause a runway incursion ATCO is aware of a conflict but misjudges the runway separation and hence gives runway entry instructions that cause a runway	Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Runway confusion Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the alistite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology Callsign confusion Current airport diagram not reflecting critical changes Takeoff without clearance	129 130 1 137 139 144 145 154 155 157
1 2 3 4 5 6 7 8		conflict ATCO misjudgement of runway		runway entry instructions that cause a runway incursion ATCO is aware of a conflict but misjudges the runway separation	Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Runway confusion Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology Callsign confusion Current airport diagram not reflecting critical changes Takeoff without clearance Landing without clearance	129 130 1 137 139 144 145 154 155 157 158
1 2 3 4 5 6 7 8 9		conflict ATCO misjudgement of runway		runway entry instructions that cause a runway incursion ATCO is aware of a conflict but misjudges the runway separation and hence gives runway entry instructions that cause a runway	Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Runway confusion Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology Callsign confusion Current airport diagram not reflecting critical changes Takeoff without clearance Landing without clearance Adverse weather / poor visibility conditions / darkness Traffic controller tiredness - Inadequate workload distribution Lack of adherence to SOP for GND movements. Lack of awareness in terms of	129 130 1 137 139 144 145 154 155 157 158 6
1 2 3 4 5 6 7 8 9		conflict ATCO misjudgement of runway		runway entry instructions that cause a runway incursion ATCO is aware of a conflict but misjudges the runway separation and hence gives runway entry instructions that cause a runway	Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Runway confusion Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology Callsign confusion Current airport diagram not reflecting critical changes Takeoff without clearance Landing without clearance Adverse weather / poor visibility conditions / darkness Traffic controller tiredness - Inadequate workload distribution Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence	129 130 1 137 139 144 145 154 155 157 158 6
1 2 3 4 5 6 7 8 9		conflict ATCO misjudgement of runway		runway entry instructions that cause a runway incursion ATCO is aware of a conflict but misjudges the runway separation and hence gives runway entry instructions that cause a runway	Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Runway confusion Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology Callsign confusion Current airport diagram not reflecting critical changes Takeoff without clearance Landing without clearance Adverse weather / poor visibility conditions / darkness Traffic controller tiredness - Inadequate workload distribution Lack of adherence to SOP for GND movements. Lack of awareness in terms of	129 130 1 137 139 144 145 154 155 157 158 6
1 2 3 4 5 6 7 8 9		conflict ATCO misjudgement of runway		ATCO is aware of a conflict but misjudges the runway separation and hence gives runway entry instructions that cause a runway incursion	Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Runway confusion Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology Callsign confusion Current airport diagram not reflecting critical changes Takeoff without clearance Landing without clearance Adverse weather / poor visibility conditions / darkness Traffic controller tiredness - Inadequate workload distribution Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Flaws in traffic controller requirements definition process and/or training	129 130 1 137 139 144 145 155 157 158 6 137
1 2 3 4 5 5 9 1 2 2 3 4 5 5		conflict ATCO misjudgement of runway		ATCO is aware of a conflict but misjudges the runway separation and hence gives runway entry instructions that cause a runway incursion Ground radar is not installed at the airport or radar is not used by	Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Runway confusion Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology Callsign confusion Current airport diagram not reflecting critical changes Takeoff without clearance Landing without clearance Adverse weather / poor visibility conditions / darkness Traffic controller tiredness - Inadequate workload distribution Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Flaws in traffic controller requirements definition process and/or training methodology	129 130 1 137 139 144 145 154 155 157 158 6 137 143
1 2 3 4 5 5 9 1 2 2 3 4 5 5	7	ATCO misjudgement of runway separation	TO32B41122	ATCO is aware of a conflict but misjudges the runway separation and hence gives runway entry instructions that cause a runway incursion	Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Runway confusion Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology Callsign confusion Current airport diagram not reflecting critical changes Takeoff without clearance Landing without clearance Adverse weather / poor visibility conditions / darkness Traffic controller tiredness - Inadequate workload distribution Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Flaws in traffic controller requirements definition process and/or training methodology Inadequate management / separation of takeoffs and landings	129 130 1 137 139 144 145 157 158 6 137 143 145 153 137
1 2 3 4 5 5 9 1 2 2 3 4 5 5	7	ATCO misjudgement of runway separation	TO32B41122	ATCO is aware of a conflict but misjudges the runway separation and hence gives runway entry instructions that cause a runway incursion Ground radar is not installed at the airport or radar is not used by	Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Runway confusion Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology Callsign confusion Current airport diagram not reflecting critical changes Takeoff without clearance Landing without clearance Adverse weather / poor visibility conditions / darkness Traffic controller tiredness - Inadequate workload distribution Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Flaws in traffic controller requirements definition process and/or training methodology Inadequate management / separation of takeoffs and landings Traffic controller tiredness - Inadequate workload distribution	129 130 1 137 139 144 145 155 157 158 6 137 143 145



		Base event	Code	Definition	Identifiable Precursors	No.
4		base event	Code	Definition	Lack of adherence to SOP in terms of awareness on supporting systems (warning) -	171
4					ground radar.	1/1
1	9	Ground radar failure	TO32B411112	Ground radar fails to produce adequate position information on aircraft or vehicle	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
2					Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150
_					distribution Inadequate certification process and / or flaws in methodology concerning verification	\vdash
3					of the system / product compliance with requirements - Ground Radar	165
1	10	Ineffective ATCO use of ground radar	TO32B411113	ATCO makes inappropriate use of ground radar, resulting in	Traffic controller tiredness - Inadequate workload distribution	137
				inadequate position information	Flaws in traffic controller requirements definition process and/or training	-
2					methodology	145
3				Pilots or vehcile driver lose knowledge of aircraft position and	Unintuitive and / or error prone system manual - ground radar.	164
1	11	Flight crew lost on airport	TO32B4111211	hence fail to supply adequate position report to ATCO	Adverse weather / poor visibility conditions / darkness	6
2					Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.	142
					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151
3					or / and passive contribution to the PF duties	\blacksquare
5					Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168
6					Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	129
_					distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition	\vdash
7					process and/or training methodology	130
1	12	ATCO failure to clarify position reports	TO32B4111212	ATCO fails to clarify the incorrect position report by pilots or vehicle	Adverse weather / poor visibility conditions / darkness	6
2		,, ,,		driver	Inadvertent deviation from cleared taxi route	131
3					Traffic controller tiredness - Inadequate workload distribution	137
4					Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity	144
					Flaws in traffic controller requirements definition process and/or training	145
5					methodology	-
6				Airport ATCO fails to communicate adequately with approach/	Current airport diagram not reflecting critical changes	155
_	13	Inadequate airport ATCO coordination	TO32B411122	ground controller	Incorrect or confusing / misleading ATC instructions	133
2					Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution	134 137
					Flaws in traffic controller requirements definition process and/or training	\Box
4					methodology	145
5					Lack of or poor communication quality Lack of adherence to SOP in terms of ATCO and approach or ground controller	146
6					communication	163
1	14	Runway crossing movement	TO32B51	Aircraft or vehicle crosses runways to reach the terminal or another	Adverse weather / poor visibility conditions / darkness	6
2				departure runway	Inadvertent deviation from cleared taxi route	131
3					Lack of adherence to SOP for GND movements.	141
4					Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.	142
5					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151
6					or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution	167
7					Flaws in pilot requirements definition process and/or training methodology	168
8					Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	129
\dashv					distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition	\vdash
9					process and/or training methodology	130
1	15	Runway entry at intermediate location	TO32B52	Aircraft enters runway at intermediate location, which introduces the possibility of incursion ahead of other traffic	Adverse weather / poor visibility conditions / darkness	6
2				the possibility of mearsion aread of other traine	Inadvertent deviation from cleared taxi route	131
3					Lack of adherence to SOP for GND movements.	141
4					Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.	142
5					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151
6					or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution	167
7					Flaws in pilot requirements definition process and/or training methodology	168
\rightarrow	16	Alternating take-off and landing	TO32B53	Runway used for alternating take-offs and landings	Emergency landing	8
2 3					Takeoff without clearance Landing without clearance	157 158
4					Lack of adherence to Rules of the Air - runway used for alternating take-offs and	160
				Aircraft enters the end of a wrong runway, or enters runway	landings	\vdash
\dashv					Adverse weather / poor visibility conditions / darkness	6
1	17	Incorrect runway entry point	TO32B54	unintendedly through an intermediate taxiway or intersection		
2	17	Incorrect runway entry point	TO32B54	unintendedly through an intermediate taxiway or intersection	Inadvertent deviation from cleared taxi route	131
	17	Incorrect runway entry point	TO32B54	unintendedly through an intermediate taxiway or intersection	Lack of adherence to SOP for GND movements.	131 141
2	17	Incorrect runway entry point	TO32B54	unintendedly through an intermediate taxiway or intersection	Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.	131 141 142
2	17	Incorrect runway entry point	TO32B54	unintendedly through an intermediate taxiway or intersection	Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	131 141 142
2	17	Incorrect runway entry point	TO32854	unintendedly through an intermediate taxiway or intersection	Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.	131 141 142 151 167
2 3 4 5			TO32854		Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	131 141 142 151
2 3 4 5 6 7		Pilot failure to follow take-off	TO32854	Pilots fail to follow the take-off instruction from the ATCO, resulting	Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - inadequate workload distribution	131 141 142 151 167
2 3 4 5 6 7					Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	131 141 142 151 167 168
2 3 4 5 6 7		Pilot failure to follow take-off		Pilots fail to follow the take-off instruction from the ATCO, resulting	Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller	131 141 142 151 167 168 132
2 3 4 5 6 7		Pilot failure to follow take-off		Pilots fail to follow the take-off instruction from the ATCO, resulting	Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness- Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of English proficiency Incorrect or confusing / misleading ATC instructions	131 141 142 151 167 168 132
2 3 4 5 6 7		Pilot failure to follow take-off		Pilots fail to follow the take-off instruction from the ATCO, resulting	Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pillot triedness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWY. Lack of or poor communication quality	131 141 142 151 167 168 132 133 134
2 3 4 5 6 7 1 2 3		Pilot failure to follow take-off		Pilots fail to follow the take-off instruction from the ATCO, resulting	Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pillot tiredness- Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWY.	131 141 142 151 167 168 132 133 134



1 19 RIMCA: 2	ACAS not present	TO32B21	Runway Conflict Warning system is not installed or not in operatio at the time	Flaws in pilot requirements definition process and/or training methodology Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of adherence to SOP in terms of awareness on supporting systems (warning) - RIMCAS. Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of Runway Conflict Warning System. Runway confusion Adverse weather / poor visibility conditions / darkness Taxiway confusion Emergency landing Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWV. Inadvertent deviation from cleared taxi route Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist trequirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload
8 8 9 10 11 11 12 12 13 13 14 14 15 15 16 16 17 17 18 18 19 19 20 21 1 22 2 23 24 24 25 26 27 7 28 29 30 30 31 1 32 2 33 34 34 35 36 37 7 38 39 39				methodology Lack of adherence to SOP in terms of awareness on supporting systems (warning) - RIMCAS. Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of Runway Conflict Warning System. Runway confusion Adverse weather / poor visibility conditions / darkness Taxiway confusion Emergency landing Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWV. Inadvertent deviation from cleared taxi route Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for SND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of or on the airste or - and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of or poor communication quality Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology
8 8 9 10 11 11 12 12 13 13 14 14 15 15 16 16 17 17 18 18 19 19 20 21 1 22 2 23 24 24 25 26 27 7 28 29 30 30 31 1 32 2 33 34 34 35 36 37 7 38 39 39				Lack of adherence to SOP in terms of awareness on supporting systems (warning) - RIMCAS. Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of Runway Conflict Warning System. Runway confusion Adverse weather / poor visibility conditions / darkness Taxiway confusion Emergency landing Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWY. Inadvertent deviation from cleared taxi route Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP or OR DN movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology
8 8 9 10 11 11 12 12 13 13 14 14 15 15 16 16 17 17 18 18 19 19 20 21 1 22 2 23 24 24 25 26 27 7 28 29 30 30 31 1 32 2 33 34 34 35 36 37 7 38 38 39				Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of Runway Conflict Warning System. Runway confusion Adverse weather / poor visibility conditions / darkness Taxiway confusion Emergency landing Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWV. Inadvertent deviation from cleared taxi route Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology
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8 8 9 10 11 11 12 12 13 13 14 14 15 15 16 16 17 17 18 18 19 19 20 21 1 22 2 23 24 24 25 26 27 7 28 29 30 30 31 1 32 2 33 34 34 35 36 37 7 38 38 39				Adverse weather / poor visibility conditions / darkness Taxiway confusion Emergency landing Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWV. Inadvertent deviation from cleared taxi route Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for SND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology
8 8 9 10 11 11 12 12 13 13 14 14 15 15 16 16 17 17 18 18 19 19 20 21 1 22 2 23 24 24 25 26 27 7 28 29 30 30 31 1 32 2 33 34 34 35 36 37 7 38 38 39				Taxiway confusion Emergency landing Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWV. Inadvertent deviation from cleared taxi route Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology
11				Emergency landing Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWV. Inadvertent deviation from cleared taxi route Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of or poor communication quality Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology
11				separation on the RWV. Inadvertent deviation from cleared taxi route Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology
11				Inadvertent deviation from cleared taxi route Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of or poor communication quality Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology
12				Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology
13				Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology
14				Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology
16				spots Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology
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18 19 20 21 22 23 24 24 25 26 27 27 28 29 30 31 31 32 33 34 35 36 37 7 38 39 39				the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology
18 19 20 21 22 23 24 24 25 26 27 27 28 29 30 31 31 32 33 34 35 36 37 7 38 39 39				Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology
20 21 22 23 24 25 26 27 28 29 30 31 32 2 33 34 33 36 36 37 37 38 39 39				sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airste or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology
20 21 22 22 23 24 25 26 26 27 28 29 30 30 31 31 32 2 33 34 34 35 36 37 37 38 39 39				situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology
20 21 22 22 23 24 25 26 26 27 28 29 30 30 31 31 32 2 33 34 34 35 36 37 37 38 39 39				Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology
21				methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology
22 2 2 3 3 2 4 4 2 5 5 2 6 5 7 7 7 2 8 8 2 9 9 3 0 3 1 3 2 2 3 3 3 3 4 4 3 3 5 5 6 6 7 7 7 7 8 8 8 8 3 9 9				Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology
23 24 25 26 27 27 28 29 30 30 31 31 32 33 34 35 36 37 7 38 39 39				driver Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology
24 25 26 27 28 29 30 30 31 32 33 34 35 36 37 37 38 39				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology
25				
25				
226 277 288 299 30 31 31 32 33 33 34 35 35 36 37 37				distribution
27			1	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring
27				or / and passive contribution to the PF duties Callsign confusion
29 30 31 31 32 2 33 33 34 35 36 37 37 38 39				Current airport diagram not reflecting critical changes
30 31 31 32 32 33 33 34 35 36 37 37 38 38 39				Takeoff without clearance Landing without clearance
31 32 32 33 34 35 36 37 38				Landing without clearance Lack of adherence to Rules of the Air - runway used for alternating take-offs and
32 33 34 35 36 37 38				landings
33 34 35 36 37 38 39				Lack of adherence to SOP in terms of ATCO and approach or ground controller communication
34 35 36 37 38 39				Unintuitive and / or error prone system manual - ground radar.
35 36 37 38 39				Inadequate certification process and / or flaws in methodology concerning verification
36 37 38 39				of the system / product compliance with requirements - Ground Radar Pilot tiredness - Inadequate workload distribution
37 38 39				Flaws in pilot requirements definition process and/or training methodology
38				Hearback ommitted Lack of adherence to the current technology standards in terms of flight safety
39				supporting systems. Lack of ground radar at the airport.
				Lack of adherence to SOP in terms of awareness on supporting systems (warning) -
				ground radar. Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload
40				distribution
				Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology
120 010464	ACAS failure to altre constitution in time	T022022	Runway Conflict Warning system fails to alert ATCO in time of a	Flaws in maintenance technician / airworthiness specialist requirements definition
1 20 RIMCA	ACAS failure to give warning in time	1032822	conflict	process and/or training methodology
2				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution
2				Inadequate certification process and / or flaws in methodology concerning verification
1				of the system / product compliance with requirements - RCWS Runway confusion
5				Runway confusion Adverse weather / poor visibility conditions / darkness
6				Taxiway confusion
7			<u> </u>	Emergency landing Lack of adherence to SOP for take-off procedure in terms of maintaining adequate
8				separation on the RWY.
9				Inadvertent deviation from cleared taxi route
10			+	Lack of English proficiency Incorrect or confusing / misleading ATC instructions
12				Use of non-standard phraseology by pilot and/or controller
13				Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot
14				Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots
15				Lack of adherence to SOP for GND movements.
16				Lack of adherence to SOP for GND movements. Lack of awareness of own position on
17		1	<u> </u>	the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of
17				sufficient separation / clearence
18			1	Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity
19				
20				Flaws in traffic controller requirements definition process and/or training



_		Base event	Code	Definition	Identifiable Precursors Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	No.
21					driver	148
22					Flaws in maintenance technician / airworthiness specialist requirements definition	149
					process and/or training methodology	1.5
23					Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
24					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151
					or / and passive contribution to the PF duties	
25					Callsign confusion	154
26 27					Current airport diagram not reflecting critical changes Takeoff without clearance	155 157
28					Landing without clearance	158
29					Lack of adherence to Rules of the Air - runway used for alternating take-offs and	160
					landings	100
30					Lack of adherence to SOP in terms of ATCO and approach or ground controller communication	163
31					Unintuitive and / or error prone system manual - ground radar.	164
32					Inadequate certification process and / or flaws in methodology concerning verification	165
					of the system / product compliance with requirements - Ground Radar	
33 34					Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168
35					Hearback ommitted	169
36					Lack of adherence to the current technology standards in terms of flight safety	170
20					supporting systems. Lack of ground radar at the airport.	1.0
37					Lack of adherence to SOP in terms of awareness on supporting systems (warning) - ground radar.	171
+					Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	+-
38					distribution	129
39					Flaws in vehicle driver / equipment operator / ground agent requirements definition	130
- "		Controller failure to d to Dissess		ATCO is playted to the conflict but falls to allow and a	process and/or training methodology	+
1	21	Controller failure to respond to RIMCAS warning	TO32B23	ATCO is alerted to the conflict but fails to give response to the warning	Lack of adherence to SOP in terms of awareness on supporting systems (warning) - RIMCAS.	156
2				0	Traffic controller tiredness - Inadequate workload distribution	137
,					Flaws in traffic controller requirements definition process and/or training	145
,					methodology	-
4					Runway confusion Adverse weather / poor visibility conditions / darkness	6
6					Taxiway confusion	7
7					Emergency landing	8
8					Lack of adherence to SOP for take-off procedure in terms of maintaining adequate	123
_					separation on the RWY.	
9 10					Inadvertent deviation from cleared taxi route	131 132
11					Lack of English proficiency Incorrect or confusing / misleading ATC instructions	133
12					Use of non-standard phraseology by pilot and/or controller	134
13					Traffic controller tiredness - Inadequate workload distribution	137
14					Inefficient / confusing TWR traffic control procedures, inefficient management of hot	139
15					spots Lack of adherence to SOP for GND movements.	141
					Lack of adherence to SOP for GND movements. Lack of awareness of own position on	
16					the airsite and airport topology.	142
17					Lack of adherence to SOP for GND movements. Lack of awareness in terms of	143
\dashv					sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current	+
18					situation on the airsite or / and aircraft / vehicle proximity	144
19					Flaws in traffic controller requirements definition process and/or training	145
					methodology	
20					Lack of or poor communication quality	146
21					Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	148
					Flaws in maintenance technician / airworthiness specialist requirements definition	1
22					process and/or training methodology	149
23					Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150
\dashv					distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	
24					or / and passive contribution to the PF duties	151
25					Callsign confusion	154
26					Current airport diagram not reflecting critical changes	155
27 28					Takeoff without clearance	157
					Landing without clearance Lack of adherence to Rules of the Air - runway used for alternating take-offs and	158
29					landings	160
30					Lack of adherence to SOP in terms of ATCO and approach or ground controller	163
					communication	
31					Unintuitive and / or error prone system manual - ground radar. Inadequate certification process and / or flaws in methodology concerning verification	164
32					of the system / product compliance with requirements - Ground Radar	165
33					Pilot tiredness - Inadequate workload distribution	167
34					Flaws in pilot requirements definition process and/or training methodology	168
35					Hearback ommitted	169
36					Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ground radar at the airport.	170
_					Lack of adherence to SOP in terms of awareness on supporting systems (warning) -	1.7/
2-					ground radar.	171
37			I		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	129
37 38					distribution	1
38						\top
\dashv					Flaws in vehicle driver / equipment operator / ground agent requirements definition	130
38	77	Controller failure to resolve conflict in	TO32824	ATCO is alerted of the conflict but fails to resolve the conflict in	Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	+
38	77	Controller failure to resolve conflict in time	TO32B24	ATCO is alerted of the conflict but fails to resolve the conflict in time	Flaws in vehicle driver / equipment operator / ground agent requirements definition	130 137



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- 1	Base event	Code	Definition	Identifiable Precursors	No. 135
4				Lack of adherence to emergency procedures - RWY collision avoidance Runway confusion	135
5				Adverse weather / poor visibility conditions / darkness	6
6				Taxiway confusion	7
7				Emergency landing	8
				Lack of adherence to SOP for take-off procedure in terms of maintaining adequate	
8				separation on the RWY.	123
9				Inadvertent deviation from cleared taxi route	131
10				Lack of English proficiency	132
11				Incorrect or confusing / misleading ATC instructions	133
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36 37 38 39 11 2 3 4 4 5 6 6 7 8 8 9 10 11 12 13 14 15 16 17 18 19		TO32B111	ATCO fails to detect a conflict and give warning due to low visibility	Hearback ommitted Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ground radar at the airport. Lack of adherence to SOP in terms of awareness on supporting systems (warning) - ground radar. Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Adverse weather / poor visibility conditions / darkness Runway confusion Adverse weather / poor visibility conditions / darkness Taxiway confusion Emergency landing Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWV. Inadvertent deviation from cleared taxi route Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition	169 170 171 129 130 6 7 8 123 131 132 133 134 137 149 141 142 143 144 145
36 37 38 39 1 1 2 2 3 4 4 5 5 6 7 7 8 9 10 11 12 13 14 15 16 17 18 19 20		TO32B111	ATCO fails to detect a conflict and give warning due to low visibility	Hearback ommitted Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ground radar at the airport. Lack of adherence to SOP in terms of awareness on supporting systems (warning) - ground radar. Vehicle driver / equipment operator / ground agent tiredness - inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent trequirements definition process and/or training methodology Adverse weather / poor visibility conditions / darkness Runway confusion Adverse weather / poor visibility conditions / darkness Taxiway confusion Emergency landing Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWV. Inadvertent deviation from cleared taxi route Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements.	169 170 171 129 130 6 1 1 6 7 8 123 131 132 133 134 141 142 143 144 145 146 148
36 37 38 39 1 1 2 2 3 4 4 5 5 6 7 7 8 9 10 11 12 13 14 15 16 17 18 19 20		T032B111	ATCO fails to detect a conflict and give warning due to low visibility	Hearback ommitted Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ground radar at the airport. Lack of adherence to SOP in terms of awareness on supporting systems (warning) - ground radar. Vehicle driver / equipment operator / ground agent tiredness - inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Adverse weather / poor visibility conditions / darkness Rumway confusion Adverse weather / poor visibility conditions / darkness Taxiway confusion Adverse weather / poor visibility conditions / darkness Taxiway confusion Emergency landing Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWV. Inadvertent deviation from cleared taxi route Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist requirements definition process and/or training methodology	169 170 171 129 130 6 1 6 7 8 123 131 132 133 134 137 149 141 142 143 144 145 148
36 37 38 39 1 2 2 3 4 4 5 5 6 6 7 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21		TO32B111	ATCO fails to detect a conflict and give warning due to low visibility	Hearback ommitted Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ground radar at the airport. Lack of adherence to SOP in terms of awareness on supporting systems (warning) - ground radar. Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Adverse weather / poor visibility conditions / darkness Runway confusion Adverse weather / poor visibility conditions / darkness Taxiway confusion Emergency landing Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWV. Inadvertent deviation from cleared taxi route Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	169 170 171 129 130 6 1 6 7 8 123 131 132 133 134 137 141 142 143 144 145 146 148 149 150
36 37 38 39 1 2 2 3 4 4 5 5 6 6 7 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21		T032B111	ATCO fails to detect a conflict and give warning due to low visibility	Hearback ommitted Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ground radar at the airport. Lack of adherence to SOP in terms of awareness on supporting systems (warning) - ground radar. Vehicle driver / equipment operator / ground agent tiredness - inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent trequirements definition process and/or training methodology Adverse weather / poor visibility conditions / darkness Runway confusion Adverse weather / poor visibility conditions / darkness Taxiway confusion Emergency landing Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWV. Inadvertent deviation from cleared taxi route Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airste or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology Lack of oppor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist tredness - Inadequate workload distribution Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	169 170 171 129 130 6 1 1 6 1 7 8 123 131 132 133 134 137 149 144 145 146 148 149 150
36 33 38 39 39 11 2 2 3 3 4 4 5 5 6 6 7 7 8 8 9 9 10 11 11 12 12 13 13 14 15 15 16 16 17 17 18 18 19 19 20 20 20 21 22 22		TO32B111	ATCO fails to detect a conflict and give warning due to low visibility	Hearback ommitted Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ground radar at the airport. Lack of adherence to SOP in terms of awareness on supporting systems (warning) - ground radar. Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent trequirements definition process and/or training methodology Adverse weather / poor visibility conditions / darkness Runway confusion Adverse weather / poor visibility conditions / darkness Taxiway confusion Adverse weather / poor visibility conditions / darkness Taxiway confusion Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWV. Inadvertent deviation from cleared taxi route Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in traffic controller requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tredness - Inadequate workload distribution Lack of adherence to SOP in terms of FNF flight parameters	169 170 171 129 130 6 1 1 8 123 131 132 133 134 141 142 143 144 145 146 148 149 150
36 37 38 38 39 39 31 31 32 33 34 4 5 5 5 6 6 6 7 7 8 8 9 10 10 11 11 11 12 12 13 13 14 15 15 16 16 16 16 17 7 20 20 21 22 22 22 22 22 22 3		TO32B111	ATCO fails to detect a conflict and give warning due to low visibility	Hearback ommitted Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ground radar at the airport. Lack of adherence to SOP in terms of awareness on supporting systems (warning) - ground radar. Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent trequirements definition process and/or training methodology Adverse weather / poor visibility conditions / darkness Runway confusion Adverse weather / poor visibility conditions / darkness Taxiway confusion Emergency landing Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWV. Inadvertent deviation from cleared taxi route Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Callsign confusion	169 170 171 129 130 6 1 1 6 7 8 123 131 132 133 134 137 149 145 146 148 149 150 151 151
36 37 38 39 1 1 2 2 3 3 4 5 5 6 6 7 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24		T032B111	ATCO fails to detect a conflict and give warning due to low visibility	Hearback ommitted Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ground radar at the airport. Lack of adherence to SOP in terms of awareness on supporting systems (warning) - ground radar. Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent trequirements definition process and/or training methodology Adverse weather / poor visibility conditions / darkness Runway confusion Adverse weather / poor visibility conditions / darkness Taxiway confusion Adverse weather / poor visibility conditions / darkness Taxiway confusion Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWV. Inadvertent deviation from cleared taxi route Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of or poor communication airworthiness specialist tredness - Inadequate workload distribution Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist tredness - Inadequate workload distribution to the SOP in terms of communication between ATC and pilot / ve	169 170 171 129 130 6 1 1 6 7 8 123 131 132 133 134 145 146 148 149 150 151 154 155
36 37 38 39 1 1 2 2 3 3 4 4 5 5 6 6 7 7 8 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23		TO32B111	ATCO fails to detect a conflict and give warning due to low visibility	Hearback ommitted Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ground radar at the airport. Lack of adherence to SOP in terms of awareness on supporting systems (warning) - ground radar. Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent trequirements definition process and/or training methodology Adverse weather / poor visibility conditions / darkness Runway confusion Adverse weather / poor visibility conditions / darkness Taxiway confusion Emergency landing Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWV. Inadvertent deviation from cleared taxi route Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Callsign confusion	169 170 171 129 130 6 1 6 7 8 123 131 132 133 134 137 141 142 143 144 145 146 148 149 150 151



ent	Code	Definition	Lack of adherence to Rules of the Air - runway used for alternating take-offs and	No
				160
			landings	100
			Lack of adherence to SOP in terms of ATCO and approach or ground controller	163
			communication Unintuitive and / or error prone system manual - ground radar.	164
	+		Inadequate certification process and / or flaws in methodology concerning verification	
			of the system / product compliance with requirements - Ground Radar	165
			Pilot tiredness - Inadequate workload distribution	167
			Flaws in pilot requirements definition process and/or training methodology	168
			Hearback ommitted	169
			Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ground radar at the airport.	170
			Lack of adherence to SOP in terms of awareness on supporting systems (warning) -	+
			ground radar.	171
			Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	129
			distribution	
			Flaws in vehicle driver / equipment operator / ground agent requirements definition	130
s prevents conflict detection	TO32B112	ATCO fails to detect a conflict and give warning due to darkness	process and/or training methodology Adverse weather / poor visibility conditions / darkness	6
<u></u>		,	Lack of adherence to ICAO Annex 14 and related documents in terms of airside lights	+
			distribution	147
			Runway confusion	1
			Adverse weather / poor visibility conditions / darkness	6
	+	 	Taxiway confusion	7
	+	 	Emergency landing Lack of adherence to SOP for take-off procedure in terms of maintaining adequate	٥
			separation on the RWY.	123
			Inadvertent deviation from cleared taxi route	131
			Lack of English proficiency	132
	↓		Incorrect or confusing / misleading ATC instructions	133
	+	 	Use of non-standard phraseology by pilot and/or controller	134
	+	+	Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot	137
	1		spots	139
			Lack of adherence to SOP for GND movements.	141
_			Lack of adherence to SOP for GND movements. Lack of awareness of own position on	142
			the airsite and airport topology.	172
			Lack of adherence to SOP for GND movements. Lack of awareness in terms of	143
	+		sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current	+
			situation on the airsite or / and aircraft / vehicle proximity	144
			Flaws in traffic controller requirements definition process and/or training	1
			methodology	145
			Lack of or poor communication quality	146
			Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	148
			driver	
			Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
	+		Maintenance technician / airworthiness specialist tiredness - Inadequate workload	+
			distribution	150
			Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151
			or / and passive contribution to the PF duties	
			Callsign confusion	154
			Current airport diagram not reflecting critical changes Takeoff without clearance	155 157
	+		Landing without clearance	158
	1		Lack of adherence to Rules of the Air - runway used for alternating take-offs and	1
			landings	160
			Lack of adherence to SOP in terms of ATCO and approach or ground controller	163
			communication	
	+	 	Unintuitive and / or error prone system manual - ground radar.	164
			Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground Radar	165
	+	<u> </u>	Pilot tiredness - Inadequate workload distribution	167
			Flaws in pilot requirements definition process and/or training methodology	168
			Hearback ommitted	169
			Lack of adherence to the current technology standards in terms of flight safety	170
	+	 	supporting systems. Lack of ground radar at the airport.	+
	1		Lack of adherence to SOP in terms of awareness on supporting systems (warning) - ground radar.	171
	+		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	+
			distribution	129
			Flaws in vehicle driver / equipment operator / ground agent requirements definition	130
			process and/or training methodology	
ed view from tower prevents	TO32B113	ATCO fails to detect a conflict and give warning due to the	Lack of adherence to ICAO Annex 14 and related documents in terms of nonrestricted	166
detection	+	restricted view from tower	view on airsite from TWR Runway confusion	1
	+		Adverse weather / poor visibility conditions / darkness	6
	1		Taxiway confusion	7
			Emergency landing	8
			Lack of adherence to SOP for take-off procedure in terms of maintaining adequate	123
			separation on the RWY.	
	+	 		131
	+	 		132
				134
	+	1		137
			Traffic controller tiredness - Inadequate workload distribution	1207
			Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot	4.7-
			Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	139
			Inefficient / confusing TWR traffic control procedures, inefficient management of hot	141
				Taxiway confusion Emergency landing Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWY. Inadvertent deviation from cleared taxi route Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution



		Base event	Code	Definition	Identifiable Precursors	No.
15					Lack of adherence to SOP for GND movements. Lack of awareness in terms of	143
H					sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current	
16					situation on the airsite or / and aircraft / vehicle proximity	144
17					Flaws in traffic controller requirements definition process and/or training methodology	145
18					Lack of or poor communication quality	146
19					Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	148
\vdash			-		driver Flaws in maintenance technician / airworthiness specialist requirements definition	-
20					process and/or training methodology	149
21					Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150
					distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	
22					or / and passive contribution to the PF duties	151
23 24					Callsign confusion	154 155
25					Current airport diagram not reflecting critical changes Takeoff without clearance	157
26					Landing without clearance	158
27					Lack of adherence to Rules of the Air - runway used for alternating take-offs and	160
\dashv					landings Lack of adherence to SOP in terms of ATCO and approach or ground controller	
28					communication	163
29					Unintuitive and / or error prone system manual - ground radar.	164
30					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground Radar	165
31					Pilot tiredness - Inadequate workload distribution	167
32 33					Flaws in pilot requirements definition process and/or training methodology Hearback ommitted	168 169
					Lack of adherence to the current technology standards in terms of flight safety	
34					supporting systems. Lack of ground radar at the airport.	170
35					Lack of adherence to SOP in terms of awareness on supporting systems (warning) - ground radar.	171
					ground radar. Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	12-
36					distribution	129
37					Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130
		ATCO failure to see visible aircraft in	T0000444	ATCO fails to detect a conflict and give warning due to ATCO's		_
_	26	time	TO32B114	failure to see the aircraft	Adverse weather / poor visibility conditions / darkness	6
2					Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training	137
3					methodology	145
4					Runway confusion	1
5 6					Adverse weather / poor visibility conditions / darkness Taxiway confusion	6 7
7					Emergency landing	8
8					Lack of adherence to SOP for take-off procedure in terms of maintaining adequate	123
9					separation on the RWY. Inadvertent deviation from cleared taxi route	131
10					Lack of English proficiency	132
11					Incorrect or confusing / misleading ATC instructions	133
12 13					Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution	134 137
14					Inefficient / confusing TWR traffic control procedures, inefficient management of hot	139
_					spots	
15					Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of awareness of own position on	141
16					the airsite and airport topology.	142
17					Lack of adherence to SOP for GND movements. Lack of awareness in terms of	143
					sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current	
18					situation on the airsite or / and aircraft / vehicle proximity	144
19					Flaws in traffic controller requirements definition process and/or training	145
20					methodology Lack of or poor communication quality	146
21					Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	148
					driver Flaws in maintenance technician / airworthiness specialist requirements definition	-
22			1		process and/or training methodology	149
						_
23					Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150
23					distribution	150
23 24						150 151
24 25					distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Callsign confusion	151 154
24 25 26					distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Callsign confusion Current airport diagram not reflecting critical changes	151 154 155
24 25					distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Callsign confusion	151 154
24 25 26 27					distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Callsign confusion Current airport diagram not reflecting critical changes Takeoff without clearance Landing without clearance Lack of adherence to Rules of the Air - runway used for alternating take-offs and	151 154 155 157
24 25 26 27 28 29					distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Callsign confusion Current airport diagram not reflecting critical changes Takeoff without clearance Landing without clearance Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	151 154 155 157 158 160
24 25 26 27 28					distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Callsign confusion Current airport diagram not reflecting critical changes Takeoff without clearance Landing without clearance Lack of adherence to Rules of the Air - runway used for alternating take-offs and	151 154 155 157 158
24 25 26 27 28 29					distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Callsign confusion Current airport diagram not reflecting critical changes Takeoff without clearance Landing without clearance Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings Lack of adherence to SOP in terms of ATCO and approach or ground controller communication Unintuitive and / or error prone system manual - ground radar.	151 154 155 157 158 160 163
24 25 26 27 28 29					distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Callsign confusion Current airport diagram not reflecting critical changes Takeoff without clearance Landing without clearance Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings Lack of adherence to SOP in terms of ATCO and approach or ground controller communication Unintuitive and / or error prone system manual - ground radar. Inadequate certification process and / or flaws in methodology concerning verification	151 154 155 157 158 160 163
24 25 26 27 28 29 30					distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Callsign confusion Current airport diagram not reflecting critical changes Takeoff without clearance Landing without clearance Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings Lack of adherence to SOP in terms of ATCO and approach or ground controller communication Unintuitive and / or error prone system manual - ground radar.	151 154 155 157 158 160 163
24 25 26 27 28 29 30 31 32 33					distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Callsign confusion Current airport diagram not reflecting critical changes Takeoff without clearance Landing without clearance Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings Lack of adherence to SOP in terms of ATCO and approach or ground controller communication Unintuitive and / or error prone system manual - ground radar. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground Radar Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	151 154 155 157 158 160 163 164 165 167 168
24 25 26 27 28 29 30 31 32					distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Callsign confusion Current airport diagram not reflecting critical changes Takeoff without clearance Landing without clearance Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings Lack of adherence to SOP in terms of ATCO and approach or ground controller communication Unintuitive and / or error prone system manual - ground radar. Imadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground Radar Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Hearback ommitted	151 154 155 157 158 160 163 164 165 167 168 169
24 25 26 27 28 29 30 31 32 33					distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Callsign confusion Current airport diagram not reflecting critical changes Takeoff without clearance Landing without clearance Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings Lack of adherence to SOP in terms of ATCO and approach or ground controller communication Unintuitive and / or error prone system manual - ground radar. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground Radar Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	151 154 155 157 158 160 163 164 165 167 168
24 25 26 27 28 29 30 31 32 33 34 35					distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Callsign confusion Current airport diagram not reflecting critical changes Takeoff without clearance Landing without clearance Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings Lack of adherence to SOP in terms of ATCO and approach or ground controller communication Unintuitive and / or error prone system manual - ground radar. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground Radar Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Hearback ommitted Lack of adherence to the current technology standards in terms of flight safety	151 154 155 157 158 160 163 164 165 167 168 169



	Base event	Code	Definition	Identifiable Precursors	No.
38				Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	129
				distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition	130
39				process and/or training methodology	130
1 27	ATCO failure to resolve conflict i	n time TO32B115	ATCO fails to warn the flight crew and provide a resolution of the conflict in time	Incorrect or confusing / misleading ATC instructions	133
2				Use of non-standard phraseology by pilot and/or controller	134
3				Traffic controller tiredness - Inadequate workload distribution	137
4				Flaws in traffic controller requirements definition process and/or training methodology	145
5				Lack of or poor communication quality	146
6				Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	148
7				driver Runway confusion	1
8				Adverse weather / poor visibility conditions / darkness	6
9				Taxiway confusion	7
10				Emergency landing Lack of adherence to SOP for take-off procedure in terms of maintaining adequate	8
11				separation on the RWY.	123
12 13				Inadvertent deviation from cleared taxi route	131 132
14				Lack of English proficiency Incorrect or confusing / misleading ATC instructions	133
15				Use of non-standard phraseology by pilot and/or controller	134
16				Traffic controller tiredness - Inadequate workload distribution	137
17				Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	139
18				Lack of adherence to SOP for GND movements.	141
19				Lack of adherence to SOP for GND movements. Lack of awareness of own position on	142
+			+	the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of	+
20				sufficient separation / clearence	143
21				Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity	144
+				Flaws in traffic controller requirements definition process and/or training	+
22				methodology	145
23				Lack of or poor communication quality	146
24				Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	148
25				Flaws in maintenance technician / airworthiness specialist requirements definition	149
				process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	143
26				distribution	150
27				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151
				or / and passive contribution to the PF duties	
28 29				Callsign confusion Current airport diagram not reflecting critical changes	154 155
30				Takeoff without clearance	157
31				Landing without clearance	158
32				Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	160
33				Lack of adherence to SOP in terms of ATCO and approach or ground controller	163
34				communication	164
\neg				Unintuitive and / or error prone system manual - ground radar. Inadequate certification process and / or flaws in methodology concerning verification	_
35				of the system / product compliance with requirements - Ground Radar	165
36 37				Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168
38				Hearback ommitted	169
39				Lack of adherence to the current technology standards in terms of flight safety	170
_			_	supporting systems. Lack of ground radar at the airport. Lack of adherence to SOP in terms of awareness on supporting systems (warning) -	+
40				ground radar.	171
41				Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	129
_				distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition	+
42				process and/or training methodology	130
1 28	Aircraft using runway	TO32B3	Given a runway incursion, another aircraft is present on the	not identifiable at the moment	
2			runway, thus creating a conflict	Runway confusion	1
3				Adverse weather / poor visibility conditions / darkness	6
4				Taxiway confusion	7
5				Emergency landing Lack of adherence to SOP for take-off procedure in terms of maintaining adequate	8
6				separation on the RWY.	123
7				Inadvertent deviation from cleared taxi route	131
8 9				Lack of English proficiency Incorrect or confusing / misleading ATC instructions	132 133
10				Use of non-standard phraseology by pilot and/or controller	134
11				Traffic controller tiredness - Inadequate workload distribution	137
12				Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	139
13				Lack of adherence to SOP for GND movements.	141
14				Lack of adherence to SOP for GND movements. Lack of awareness of own position on	142
-				the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of	+
15				sufficient separation / clearence	143
16				Lack of adherence to SOP for GND movements. Lack of awareness in terms of current	144
	1			situation on the airsite or / and aircraft / vehicle proximity	4
-		<u> </u>		Flaws in traffic controller requirements definition process and/or training	
17				Flaws in traffic controller requirements definition process and/or training methodology	145



		Base event	Code	Definition	Identifiable Precursors	No.
19					Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	148
Н					driver Flaws in maintenance technician / airworthiness specialist requirements definition	
20					process and/or training methodology	149
21					Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150
Н					distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	
22					or / and passive contribution to the PF duties	151
23 24					Callsign confusion	154 155
25					Current airport diagram not reflecting critical changes Takeoff without clearance	157
26					Landing without clearance	158
27					Lack of adherence to Rules of the Air - runway used for alternating take-offs and	160
Н					landings Lack of adherence to SOP in terms of ATCO and approach or ground controller	
28					communication	163
29					Unintuitive and / or error prone system manual - ground radar.	164
30					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground Radar	165
31					Pilot tiredness - Inadequate workload distribution	167
32					Flaws in pilot requirements definition process and/or training methodology	168
33					Hearback ommitted Lack of adherence to the current technology standards in terms of flight safety	169
34					supporting systems. Lack of ground radar at the airport.	170
35					Lack of adherence to SOP in terms of awareness on supporting systems (warning) -	171
Н					ground radar. Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	
36					distribution	129
37					Flaws in vehicle driver / equipment operator / ground agent requirements definition	130
H				Given ATC failure to resolve a conflict, action by the flight crew or	process and/or training methodology	-
1	29	Avoidance essential	TO32C3	vehicle driver is necessary to avoid a runway collision	not identifiable at the moment	
2				7, 11, 11	Runway confusion	1
3					Adverse weather / poor visibility conditions / darkness	6
5					Taxiway confusion Emergency landing	8
-					Lack of adherence to SOP for take-off procedure in terms of maintaining adequate	123
ь					separation on the RWY.	
7 8					Inadvertent deviation from cleared taxi route Lack of English proficiency	131 132
9					Incorrect or confusing / misleading ATC instructions	133
10					Use of non-standard phraseology by pilot and/or controller	134
11					Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot	137
12					spots	139
13					Lack of adherence to SOP for GND movements.	141
14					Lack of adherence to SOP for GND movements. Lack of awareness of own position on	142
Н					the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of	
15					sufficient separation / clearence	143
16					Lack of adherence to SOP for GND movements. Lack of awareness in terms of current	144
Н					situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training	
17					methodology	145
18					Lack of or poor communication quality	146
19					Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	148
-					Flaws in maintenance technician / airworthiness specialist requirements definition	
20					process and/or training methodology	149
21					Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150
Н					distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	
22					or / and passive contribution to the PF duties	151
23 24					Callsign confusion	154
25					Current airport diagram not reflecting critical changes Takeoff without clearance	155 157
26					Landing without clearance	158
27					Lack of adherence to Rules of the Air - runway used for alternating take-offs and	160
					landings Lack of adherence to SOP in terms of ATCO and approach or ground controller	
28					communication	163
29					Unintuitive and / or error prone system manual - ground radar.	164
30					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground Radar	165
31					Pilot tiredness - Inadequate workload distribution	167
32					Flaws in pilot requirements definition process and/or training methodology	168
33					Hearback ommitted	169
34					Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ground radar at the airport.	170
_					Lack of adherence to SOP in terms of awareness on supporting systems (warning) -	171
35						
35					ground radar.	
35 36					Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	129
36					Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition	129
36 37					Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	129 130
36 37 38					Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Adverse weather / poor visibility conditions / darkness	129 130 6
36 37					Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	129 130
36 37 38 39 40 41					Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Adverse weather / poor visibility conditions / darkness Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Lack of adherence to emergency procedures - RWY collision avoidance	129 130 6 133 134 135
36 37 38 39 40					Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Adverse weather / poor visibility conditions / darkness Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller	129 130 6 133 134



	Base event	Code	Definition	Identifiable Precursors	No.
44				Lack of or poor communication quality	146
45				Lack of adherence to ICAO Annex 14 and related documents in terms of airside lights distribution	147
46				Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	148
				driver Flaws in maintenance technician / airworthiness specialist requirements definition	1.00
47				process and/or training methodology	149
48				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
49				Inadequate certification process and / or flaws in methodology concerning verification	205
-				of the system / product compliance with requirements - RCWS Lack of adherence to ICAO Annex 14 and related documents in terms of nonrestricted	
50				view on airsite from TWR	166
51				Lack of adherence to SOP in terms of awareness on supporting systems (warning) -	156
				RIMCAS. Lack of adherence to the current technology standards in terms of flight safety	╆
52				supporting systems. Lack of Runway Conflict Warning System.	172
1 30	Ineffective avoidance by intruding aircraft/vehicle	TO32B12	Flight crew from the intruding aircraft or driver of the intruding vehicle fails to avoid the collision	Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity	144
2				Pilot tiredness - Inadequate workload distribution	167
3				Flaws in pilot requirements definition process and/or training methodology	168
5				Runway confusion Adverse weather / poor visibility conditions / darkness	6
6				Taxiway confusion	7
7				Emergency landing	8
8				Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWY.	123
9				Inadvertent deviation from cleared taxi route	131
10 11		+		Lack of English proficiency Incorrect or confusing / misleading ATC instructions	132 133
12				Use of non-standard phraseology by pilot and/or controller	134
13				Traffic controller tiredness - Inadequate workload distribution	137
14				Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	139
15				Lack of adherence to SOP for GND movements.	141
16				Lack of adherence to SOP for GND movements. Lack of awareness of own position on	142
_				the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of	+-
17				sufficient separation / clearence	143
18				Lack of adherence to SOP for GND movements. Lack of awareness in terms of current	144
				situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training	╁
19				methodology	145
20				Lack of or poor communication quality	146
21				Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	148
22				Flaws in maintenance technician / airworthiness specialist requirements definition	149
				process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	1.0
23				distribution	150
24				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151
25				or / and passive contribution to the PF duties Callsign confusion	154
26				Current airport diagram not reflecting critical changes	155
27				Takeoff without clearance	157
28				Landing without clearance Lack of adherence to Rules of the Air - runway used for alternating take-offs and	158
29				landings	160
30				Lack of adherence to SOP in terms of ATCO and approach or ground controller	163
31				communication Unintuitive and / or error prone system manual - ground radar.	164
32				Inadequate certification process and / or flaws in methodology concerning verification	
33				of the system / product compliance with requirements - Ground Radar Pilot tiredness - Inadequate workload distribution	
34				Flaws in pilot requirements definition process and/or training methodology	167 168
35				Hearback ommitted	169
36				Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ground radar at the airport.	170
37				Lack of adherence to SOP in terms of awareness on supporting systems (warning) -	171
3,				ground radar.	1/1
38				Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129
39				Flaws in vehicle driver / equipment operator / ground agent requirements definition	130
		-		process and/or training methodology	_
40 41				Adverse weather / poor visibility conditions / darkness Incorrect or confusing / misleading ATC instructions	6 133
42				Use of non-standard phraseology by pilot and/or controller	134
43 44				Lack of adherence to emergency procedures - RWY collision avoidance Traffic controller tiredness - Inadequate workload distribution	135 137
				Flaws in traffic controller requirements definition process and/or training	
45				methodology	145
46		+		Lack of or poor communication quality Lack of adherence to ICAO Annex 14 and related documents in terms of airside lights	146
47				distribution	147
48				Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	148
_		+		driver Flaws in maintenance technician / airworthiness specialist requirements definition	+
	I .	1	Ĺ	process and/or training methodology	149
49				process and/or training methodology	
49 50				Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150
_					150 205



		Base event	Code	Definition	Identifiable Precursors	No.
52					Lack of adherence to ICAO Annex 14 and related documents in terms of nonrestricted	166
4					view on airsite from TWR Lack of adherence to SOP in terms of awareness on supporting systems (warning) -	
53					RIMCAS.	156
54					Lack of adherence to the current technology standards in terms of flight safety	172
34					supporting systems. Lack of Runway Conflict Warning System.	1/2
1	31	Ineffective avoidance by impeded aircraft	TO32B13	Flight crew from the impeded aircraft fails to avoid the collision	Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity	144
2		anciait			Pilot tiredness - Inadequate workload distribution	167
3					Flaws in pilot requirements definition process and/or training methodology	168
4					Runway confusion	1
5					Adverse weather / poor visibility conditions / darkness	6
6 7					Taxiway confusion Emergency landing	7 8
+					Lack of adherence to SOP for take-off procedure in terms of maintaining adequate	
8					separation on the RWY.	123
9					Inadvertent deviation from cleared taxi route	131
10					Lack of English proficiency	132
11 12					Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller	133 134
13					Traffic controller tiredness - Inadequate workload distribution	137
14					Inefficient / confusing TWR traffic control procedures, inefficient management of hot	139
_					spots	_
15					Lack of adherence to SOP for GND movements.	141
16					Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.	142
#					Lack of adherence to SOP for GND movements. Lack of awareness in terms of	
17					sufficient separation / clearence	143
18					Lack of adherence to SOP for GND movements. Lack of awareness in terms of current	144
4					situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training	
19					Flaws in traffic controller requirements definition process and/or training methodology	145
20					Lack of or poor communication quality	146
21					Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	148
					driver	140
22					Flaws in maintenance technician / airworthiness specialist requirements definition	149
\dashv					process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	-
23					distribution	150
24					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151
					or / and passive contribution to the PF duties	_
25					Callsign confusion	154
26 27					Current airport diagram not reflecting critical changes Takeoff without clearance	155 157
28					Landing without clearance	158
29					Lack of adherence to Rules of the Air - runway used for alternating take-offs and	160
29					landings	160
30					Lack of adherence to SOP in terms of ATCO and approach or ground controller	163
31					communication Unintuitive and / or error prone system manual - ground radar.	164
\neg					Inadequate certification process and / or flaws in methodology concerning verification	
32					of the system / product compliance with requirements - Ground Radar	165
33					Pilot tiredness - Inadequate workload distribution	167
34 35					Flaws in pilot requirements definition process and/or training methodology	168
\neg					Hearback ommitted Lack of adherence to the current technology standards in terms of flight safety	169
36					supporting systems. Lack of ground radar at the airport.	170
27					Lack of adherence to SOP in terms of awareness on supporting systems (warning) -	171
37					ground radar.	171
38					Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	129
4					distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition	-
39					process and/or training methodology	130
40					Adverse weather / poor visibility conditions / darkness	6
41					Incorrect or confusing / misleading ATC instructions	133
42					Use of non-standard phraseology by pilot and/or controller	134
43 44					Lack of adherence to emergency procedures - RWY collision avoidance Traffic controller tiredness - Inadequate workload distribution	135 137
\neg					Flaws in traffic controller requirements definition process and/or training	
45					methodology	145
46					Lack of or poor communication quality	146
47					Lack of adherence to ICAO Annex 14 and related documents in terms of airside lights	147
4					distribution	
48					Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	148
_					Flaws in maintenance technician / airworthiness specialist requirements definition	1.00
49					process and/or training methodology	149
50					Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150
4					distribution	
51					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - RCWS	205
+					Lack of adherence to ICAO Annex 14 and related documents in terms of nonrestricted	t. –
52					view on airsite from TWR	166
					Lack of adherence to SOP in terms of awareness on supporting systems (warning) -	156
52					RIMCAS.	130
53					Lack of adherence to the current technology standards in terms of flight safety	1
53 54						172
54	ESD 36	Ground collision imminent	Code	Definition	supporting systems. Lack of Runway Conflict Warning System.	1/2
54		Ground collision imminent Ground agent error in moving	Code	Definition Deviation from procedures in positioning or moving equipment	supporting systems. Lack of Runway Conflict Warning System. Identifiable Precursors	
54		Ground collision imminent Ground agent error in moving equipment	Code TO36F11111	Definition Deviation from procedures in positioning or moving equipment (e.g. vehicle, steps, baggage loader etc) by ground agent	supporting systems. Lack of Runway Conflict Warning System.	6



		Base event	Code	Definition	Identifiable Precursors	No.
3					Flaws in vehicle driver / equipment operator / ground agent requirements definition	130
4					process and/or training methodology Lack of adherence to SOP for GND movements.	141
-4				Deviation from procedures in positioning or moving equipment	Lack of autherence to SOP for GND movements.	141
1	2	Ground equipment fault	TO36F11112	(e.g. vehicle, steps, baggage loader etc) due to equipment fault (e.g. brake failure)	Flaws in ground equipment maintenance process	128
2					Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129
3					Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130
4					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment	n 261
1	3	Ground movement deviation conflicts with aircraft	TO36F1112	Deviation from procedures in positioning or moving equipment (e.g. vehicle, steps, baggage loader etc) causes imminent collision with aircraft	Adverse weather / poor visibility conditions / darkness	6
2					Flaws in ground equipment maintenance process Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	128 129
4					distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition	130
5					process and/or training methodology Lack of adherence to SOP for GND movements.	141
6					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment	n 261
1	4	Flight crew braking error allows movement while parked	TO36F11211	Flight crew fail to set brakes or maintain idle thrust, resulting in movement of parked aircraft	Lack of adherence to SOP for GND movements. Poor execution of parking / docking /pushback procedure	138
2					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151
3			 		or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution	167
4			 		Flaws in pilot requirements definition process and/or training methodology	168
1	5	Movement of other aircraft deviates	TO36F11212	Other aircraft being pushed back or taxied nearby deviates from	Adverse weather / poor visibility conditions / darkness	6
_	,	from procedures	1030/11212	the intended trajectory		
2					Flaws in ground equipment maintenance process Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	128
3					distribution	129
					Flaws in vehicle driver / equipment operator / ground agent requirements definition	420
4					process and/or training methodology	130
5					Lack of adherence to SOP for GND movements. Poor execution of parking / docking	138
-				Deviation from the intended traington, but he aircraft causes	/pushback procedure	+
1	6	Aircraft deviation creates conflict	TO36F1122	Deviation from the intended trajectory by the aircraft causes imminent collision	Adverse weather / poor visibility conditions / darkness	6
2				The state of the s	Taxiway incursion	9
3					Inadvertent deviation from cleared taxi route	131
4					Lack of adherence to SOP for GND movements. Lack of awareness of own position on	142
_					the airsite and airport topology.	
5					Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity	144
					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	
6					or / and passive contribution to the PF duties	151
7					Pilot tiredness - Inadequate workload distribution	167
8				lands with a subbank decrease by ATC and fallow to allow	Flaws in pilot requirements definition process and/or training methodology	168
1	7	Inadequate pushback clearance	TO36F1211	Inadequate pushback clearance by ATC, e.g. failure to give information on passing traffic	Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	127
2				minormation on passing traine	Traffic controller tiredness - Inadequate workload distribution	137
3					Flaws in traffic controller requirements definition process and/or training methodology	145
4					Current airport diagram not reflecting critical changes	155
1	8	Pushback equipment fault	TO36F1212	Deviation from intended pushback trajectory due to equipment fault (e.g. towbar failure)	Flaws in ground equipment maintenance process	128
2					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment	n 261
1	9	Ground crew error in pushback	TO36F1213	Deviation from intended pushback trajectory due to ground crew error	Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129
2					Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130
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4	10 1 2 3	18			Deviation from intended taxi-in trajectory due to aircraft fault (e.g.	controller. Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Stand confusion Traffic controller tiredness - Inadequate workload distribution Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Flaws in traffic controller requirements definition process and/or training methodology Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tredness - Inadequate workload	127 132 133 134 143 145 146 148 10 137 142 145 124
control related system and components (incl. brake) 1 20 Flight crew handling error in taxi-in TO36F14132 Deviation from intended taxi-in trajectory due to flight crew handling error in taxi-in TO36F14132 Deviation from intended taxi-in trajectory due to flight crew methodology methodology methodology 2 Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties in fladequate system and components (incl. brake) 151 152 153 154 155 157 158 158 159 159 150 150 150 150 150 150	10 1 2 3	18			Deviation from intended taxi-in trajectory due to aircraft fault (e.g.	controller. Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Stand confusion Traffic controller tiredness - Inadequate workload distribution Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Flaws in traffic controller requirements definition process and/or training methodology Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	127 132 133 134 137 143 145 146 148 10 137 142 145 124
1 20 Flight crew handling error in taxi-in TO36F14132 Deviation from intended taxi-in trajectory due to flight crew handling error in taxi-in TO36F14132 Deviation from intended taxi-in trajectory due to flight crew methodology Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties 3 Inadequate stall recovery procedure for the aircraft 152 4 Inadequate stall recovery procedure workload distribution 137	10 1 2 3 4	18			Deviation from intended taxi-in trajectory due to aircraft fault (e.g.	controller. Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Stand confusion Traffic controller tiredness - Inadequate workload distribution Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Flaws in traffic controller requirements definition process and/or training methodology Flaws in manufacturer quality control process - taxling related control system (e.g. Brake failure) Flaws in manufacturer quality control process - taxling related control system (e.g. Brake failure) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification	127 132 133 134 137 143 145 146 148 10 137 142 145 124
Fight crew handling error in taxi-in U36+14132 handling error methodology 145	10 1 2 3	18			Deviation from intended taxi-in trajectory due to aircraft fault (e.g.	controller. Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Stand confusion Traffic controller tiredness - Inadequate workload distribution Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Flaws in traffic controller requirements definition process and/or training methodology Flaws in traffic controller requirements definition process and/or training methodology Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist reduess - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing	127 132 133 134 137 143 145 146 148 10 137 142 145 124
or / and passive contribution to the PF duties linadequate stall recovery procedure for the aircraft 152 Inadequate stall recovery procedure for the aircraft 152 Traffic controller tiredness - Inadequate workload distribution 137	10 1 2 3 4 1 2	19	Aircraft fault causes deviation in taxi-in	TO36F14131	Deviation from intended taxi-in trajectory due to aircraft fault (e.g. brake failure)	controller. Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Stand confusion Traffic controller tiredness - Inadequate workload distribution Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Flaws in traffic controller requirements definition process and/or training methodology Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure) Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake)	127 132 133 134 137 143 145 146 148 10 137 142 145 124 149 150
or / and passive contribution to the PF duties Inadequate stall recovery procedure for the aircraft 152 Traffic controller tiredeness - Inadequate workload distribution 137	10 1 2 3 4 1 2	19	Aircraft fault causes deviation in taxi-in	TO36F14131	Deviation from intended taxi-in trajectory due to aircraft fault (e.g. brake failure) Deviation from intended taxi-in trajectory due to flight crew	controller. Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Stand confusion Traffic controller tiredness - Inadequate workload distribution Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Flaws in traffic controller requirements definition process and/or training methodology Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist requirements definition forcess and/or training nethodology Training are though a process and/or training nethodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake) Flaws in traffic controller requirements definition process and/or training methodology	127 132 133 134 137 143 145 146 148 10 137 142 145 124 149 150
4 Traffic controller tiredness - Inadequate workload distribution 137	10 1 2 3 4 1 2 3	19	Aircraft fault causes deviation in taxi-in	TO36F14131	Deviation from intended taxi-in trajectory due to aircraft fault (e.g. brake failure) Deviation from intended taxi-in trajectory due to flight crew	controller. Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Stand confusion Traffic controller tiredness - Inadequate workload distribution Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Flaws in traffic controller requirements definition process and/or training methodology Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist reduress - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake) Flaws in traffic controller requirements definition process and/or training methodology Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	127 132 133 134 137 143 145 146 148 10 137 142 145 124 149 150
	10 1 2 3 4 1 2 3	19	Aircraft fault causes deviation in taxi-in	TO36F14131	Deviation from intended taxi-in trajectory due to aircraft fault (e.g. brake failure) Deviation from intended taxi-in trajectory due to flight crew	controller. Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Stand confusion Traffic controller tiredness - Inadequate workload distribution Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Flaws in traffic controller requirements definition process and/or training methodology Flaws in manufacturer quality control process - taxling related control system (e.g. Brake failure) Flaws in manufacturer quality control process - taxling related control system (e.g. Brake failure) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxling control related system and components (incl. brake) Flaws in traffic controller requirements definition process and/or training methodology Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	127 132 133 134 137 143 145 146 148 10 137 142 145 124 149 150
	10 1 2 3 4 1 2 3	19	Aircraft fault causes deviation in taxi-in	TO36F14131	Deviation from intended taxi-in trajectory due to aircraft fault (e.g. brake failure) Deviation from intended taxi-in trajectory due to flight crew	controller. Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Stand confusion Traffic controller tiredness - Inadequate workload distribution Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Flaws in traffic controller requirements definition process and/or training methodology Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist reduces - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake) Flaws in traffic controller requirements definition process and/or training methodology Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Inadequate stall recovery procedure for the aircraft	127 132 133 134 137 143 145 146 148 10 137 142 145 124 149 150 196 145



		Base event	Code	Definition	Identifiable Precursors	No
1	21	Flight crew violation of taxi procedures	TO36F14133	Deviation from intended taxi-in trajectory due to flight crew procedural violation	Lack of adherence to SOP for GND movements.	141
2				p-occura volución	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151
3					or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution	167
4					Flaws in pilot requirements definition process and/or training methodology	168
1	22	Ground crew error marshalling onto	TO36F14134	Deviation from intended taxi-in trajectory due to marshalling error	Adverse weather / poor visibility conditions / darkness	6
2		stand			Lack of adherence to SOP for GND movements in terms of marshalling procedure	125
3					Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	129
7					distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition	
4					process and/or training methodology	130
1	23	Ground agent error in moving	TO36F14141	Deviation from intended taxi-in trajectory due to ground agent	Adverse weather / poor visibility conditions / darkness	6
2		equipment		error in moving equipment	Taxiway incursion	9
3					Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	129
+					distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition	+
4					process and/or training methodology	130
5				Desirable of the internal of t	Lack of adherence to SOP for GND movements.	141
1	24	Ground equipment fault	TO36F14142	Deviation from intended taxi-in trajectory due to ground equipment fault	Taxiway incursion	9
2					Flaws in ground equipment maintenance process	128
3					Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129
1					Flaws in vehicle driver / equipment operator / ground agent requirements definition	130
4					process and/or training methodology	130
5					Inadequate certification process and / or flaws in methodology concerning verification	1 261
					of the system / product compliance with requirements - Ground equipment	
1	25	Taxi-in deviation creates conflict	TO36F142	Deviation from the intended taxi-in trajectory causes imminent	Adverse weather / poor visibility conditions / darkness	6
+				collision	Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	+
2					distribution	129
3					Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130
4					Pilot tiredness - Inadequate workload distribution	167
5					Flaws in pilot requirements definition process and/or training methodology	168
6					Lack of adherence to SOP for GND movements.	141
1	26	Avoidance impracticable for flight crew	TO36B21	Conflict cannot be avoided by flight crew	not identifiable at that level	
2					Adverse weather / poor visibility conditions / darkness	6
4					Taxiway incursion Stand confusion	9 10
_					Flaws in manufacturer quality control process - taxiing related control system (e.g.	124
6					Brake failure)	_
ь					Lack of adherence to SOP for GND movements in terms of marshalling procedure Lack of adherence to SOP for GND movements in terms of flight crew - ground crew	125
7					comunication.	126
8					Lack of adherence to SOP for GND movements in terms of clearance providing by the	127
9					controller. Flaws in ground equipment maintenance process	128
10					Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	129
+					distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition	+
11					process and/or training methodology	130
12					Inadvertent deviation from cleared taxi route	131
13 14					Lack of English proficiency Incorrect or confusing / misleading ATC instructions	132
15					Use of non-standard phraseology by pilot and/or controller	134
16					Traffic controller tiredness - Inadequate workload distribution	137
17					Lack of adherence to SOP for GND movements. Poor execution of parking / docking /pushback procedure	138
18					Lack of adherence to SOP for GND movements. Lack of awareness of other traffic	140
_					movements through listening of ATC communications	
19					Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of awareness of own position on	141
20					the airsite and airport topology.	142
21					Lack of adherence to SOP for GND movements. Lack of awareness in terms of	143
+					sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current	╁
22					situation on the airsite or / and aircraft / vehicle proximity	144
23]				Flaws in traffic controller requirements definition process and/or training	145
4					methodology Lack of or poor communication quality	146
25					Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	
+					driver Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	+
26					or / and passive contribution to the PF duties	15.
7					Current airport diagram not reflecting critical changes	155
28 29					Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	168
1					Inadequate certification process and / or flaws in methodology concerning verification	
30					of the system / product compliance with requirements - marshalling/rolling/taxiing	196
+					control related system and components (incl. brake)	+
31					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment	¹ 261
		0.00		en la constant de la	of the system / product compliance with requirements - Ground equipment	\perp
		Conflict virtually invisible from flight		Flight crew fail to avoid conflict because point of conflict (e.g. wing	Lack of adherence to SOP for GND movements. Lack of awareness in terms of current	1
1	27	deck	TO36B22	tip) cannot be seen from the flight deck	situation on the airsite or / and aircraft / vehicle proximity	144



3		Base event	Code	Definition	Identifiable Precursors	No.
					Taxiway incursion	9
4					Stand confusion	10
5					Flaws in manufacturer quality control process - taxiing related control system (e.g.	124
					Brake failure)	
6	_				Lack of adherence to SOP for GND movements in terms of marshalling procedure	125
7					Lack of adherence to SOP for GND movements in terms of flight crew - ground crew	126
_	_				comunication. Lack of adherence to SOP for GND movements in terms of clearance providing by the	
8					controller.	127
9					Flaws in ground equipment maintenance process	128
1					Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	
10					distribution	129
					Flaws in vehicle driver / equipment operator / ground agent requirements definition	
11					process and/or training methodology	130
12					Inadvertent deviation from cleared taxi route	131
13					Lack of English proficiency	132
14					Incorrect or confusing / misleading ATC instructions	133
15					Use of non-standard phraseology by pilot and/or controller	134
16					Traffic controller tiredness - Inadequate workload distribution	137
17					Lack of adherence to SOP for GND movements. Poor execution of parking / docking	138
					/pushback procedure	130
18					Lack of adherence to SOP for GND movements. Lack of awareness of other traffic	140
					movements through listening of ATC communications	
19	\rightarrow				Lack of adherence to SOP for GND movements.	141
20					Lack of adherence to SOP for GND movements. Lack of awareness of own position on	142
+	\dashv				the airsite and airport topology.	1
21					Lack of adherence to SOP for GND movements. Lack of awareness in terms of	143
+	\rightarrow				sufficient separation / clearence	\vdash
22					Lack of adherence to SOP for GND movements. Lack of awareness in terms of current	144
+	\rightarrow				situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training	\vdash
23					methodology	145
24	\dashv				Lack of or poor communication quality	146
	\rightarrow				Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	
25					driver	148
					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	
26					or / and passive contribution to the PF duties	151
27					Current airport diagram not reflecting critical changes	155
28					Pilot tiredness - Inadequate workload distribution	167
29					Flaws in pilot requirements definition process and/or training methodology	168
					Inadequate certification process and / or flaws in methodology concerning verification	
					of the system / product compliance with requirements - marshalling/rolling/taxiing	196
30	- 1					
30					control related system and components (incl. brake)	
30					Inadequate certification process and / or flaws in methodology concerning verification	261
				Flight countail to avaid conflict because thousaisiudes the	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment	261
	F	ilight crew misjudgement of clearance	TO36B23	Flight crew fail to avoid conflict because they misjudge the clearance	Inadequate certification process and / or flaws in methodology concerning verification	261 143
31	F	light crew misjudgement of clearance	TO36B23		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment Lack of adherence to SOP for GND movements. Lack of awareness in terms of	
31	F	light crew misjudgement of clearance	TO36B23		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence	143
31	F	ilight crew misjudgement of clearance	TO36B23		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Pilot tiredness - Inadequate workload distribution	143 167
31	F	ilight crew misjudgement of clearance	TO36B23		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	143 167 168 6 9
31	F	light crew misjudgement of clearance	TO36B23		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Adverse weather / poor visibility conditions / darkness Taxiway incursion Stand confusion	143 167 168 6
31	F	light crew misjudgement of clearance	T036823		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Adverse weather / poor visibility conditions / darkness Taxiway incursion Stand confusion Flaws in manufacturer quality control process - taxiing related control system (e.g.	143 167 168 6 9
31	F	ilight crew misjudgement of clearance	T036B23		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Adverse weather / poor visibility conditions / darkness Taxiway incursion Stand confusion Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure)	143 167 168 6 9 10
31	F	light crew misjudgement of clearance	T036823		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Adverse weather / poor visibility conditions / darkness Taxiway incursion Stand confusion Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure	143 167 168 6 9
31	F	light crew misjudgement of clearance	TO36823		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Adverse weather / poor visibility conditions / darkness Taxiway incursion Stand confusion Flaws in manufacturer quality control process - taxing related control system (e.g. Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure Lack of adherence to SOP for GND movements in terms of flight crew - ground crew	143 167 168 6 9 10
31	F	ilight crew misjudgement of clearance	T036823		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Adverse weather / poor visibility conditions / darkness Taxiway incursion Stand confusion Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication.	143 167 168 6 9 10 124 125
31	F	ilight crew misjudgement of clearance	T036B23		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Pilot tirechaes - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Adverse weather / poor visibility conditions / darkness Taxiway incursion Stand confusion Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication. Lack of adherence to SOP for GND movements in terms of clearance providing by the	143 167 168 6 9 10 124 125
31 1 28 2 3 4 5 6 7 8 9	F	light crew misjudgement of clearance	T036823		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Adverse weather / poor visibility conditions / darkness Taxiway incursion Stand confusion Flaws in manufacturer quality control process - taxing related control system (e.g. Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication. Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	143 167 168 6 9 10 124 125 126
31 1 28 2 3 4 4 5 6 6 7 8 9	F	light crew misjudgement of clearance	T036823		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Adverse weather / poor visibility conditions / darkness Taxiway incursion Stand confusion Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication. Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Flaws in ground equipment maintenance process	143 167 168 6 9 10 124 125 126 127
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		Base event	Code	Definition	Identifiable Precursors	No.
24					Lack of or poor communication quality	146
25					Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	148
26					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151
					or / and passive contribution to the PF duties	
27 28					Current airport diagram not reflecting critical changes Pilot tiredness - Inadequate workload distribution	155 167
29					Flaws in pilot requirements definition process and/or training methodology	168
					Inadequate certification process and / or flaws in methodology concerning verification	
30					of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake)	196
						\vdash
31					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment	261
32					Lack of adherence to emergency procedures - RWY collision avoidance Lack of adherence to SOP for GND movements. Lack of awareness in terms of	135
33					sufficient separation / clearence	143
34					Lack of adherence to SOP for GND movements. Lack of awareness in terms of current	144
					situation on the airsite or / and aircraft / vehicle proximity	
35 36					Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168
	24	0 60	T005040	Ground crew fail to avoid conflict because point of conflict (e.g.	Lack of adherence to SOP for GND movements. Lack of awareness in terms of current	
1	31	Conflict virtually invisible from tug	TO36B12	wing tip) cannot be seen from the tug	situation on the airsite or / and aircraft / vehicle proximity	144
2					Adverse weather / poor visibility conditions / darkness	6
4					Taxiway incursion Stand confusion	9 10
_					Flaws in manufacturer quality control process - taxiing related control system (e.g.	
5					Brake failure)	124
6					Lack of adherence to SOP for GND movements in terms of marshalling procedure	125
7					Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication.	126
					Lack of adherence to SOP for GND movements in terms of clearance providing by the	127
8					controller.	_
9					Flaws in ground equipment maintenance process	128
10					Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129
					Flaws in vehicle driver / equipment operator / ground agent requirements definition	1
11					process and/or training methodology	130
12					Inadvertent deviation from cleared taxi route	131
13					Lack of English proficiency Incorrect or confusing / misleading ATC instructions	132 133
15					Use of non-standard phraseology by pilot and/or controller	134
16					Traffic controller tiredness - Inadequate workload distribution	137
17					Lack of adherence to SOP for GND movements. Poor execution of parking / docking	138
					/pushback procedure Lack of adherence to SOP for GND movements. Lack of awareness of other traffic	\vdash
18					movements through listening of ATC communications	140
19					Lack of adherence to SOP for GND movements.	141
20					Lack of adherence to SOP for GND movements. Lack of awareness of own position on	142
					the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of	\vdash
21					sufficient separation / clearence	143
22					Lack of adherence to SOP for GND movements. Lack of awareness in terms of current	144
					situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training	\vdash
23					methodology	145
24					Lack of or poor communication quality	146
25					Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	148
					driver Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	
26					or / and passive contribution to the PF duties	151
27					Current airport diagram not reflecting critical changes	155
28 29					Pilot tiredness - Inadequate workload distribution	167 168
29					Flaws in pilot requirements definition process and/or training methodology Inadequate certification process and / or flaws in methodology concerning verification	_
30					of the system / product compliance with requirements - marshalling/rolling/taxing	196
					control related system and components (incl. brake)	₩'
31					Inadequate certification process and / or flaws in methodology concerning verification	261
31					of the system / product compliance with requirements - Ground equipment	201
32					Lack of adherence to emergency procedures - RWY collision avoidance	135
33					Lack of adherence to SOP for GND movements. Lack of awareness in terms of	143
					sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current	
34					situation on the airsite or / and aircraft / vehicle proximity	144
35					Pilot tiredness - Inadequate workload distribution	167
36				Cround grow fail to avoid flist be	Flaws in pilot requirements definition process and/or training methodology	168
1	32	Inadequate monitoring by ground crew	TO36B13	Ground crew fail to avoid conflict because they are not monitoring the clearance	Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129
_					Flaws in vehicle driver / equipment operator / ground agent requirements definition	130
2					process and/or training methodology	130
3					Lack of adherence to SOP for GND movements.	141
5					Adverse weather / poor visibility conditions / darkness Taxiway incursion	6 9
					Stand confusion	10
6					Flaws in manufacturer quality control process - taxiing related control system (e.g.	124
_						124
7					Brake failure)	125
6 7 8					Lack of adherence to SOP for GND movements in terms of marshalling procedure	125
7					Lack of adherence to SOP for GND movements in terms of marshalling procedure Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication.	125 126
6 7 8					Lack of adherence to SOP for GND movements in terms of marshalling procedure Lack of adherence to SOP for GND movements in terms of flight crew - ground crew	



		Base event	Code	Definition	Identifiable Precursors	No.
11					Flaws in ground equipment maintenance process	128
12					Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129
_					Flaws in vehicle driver / equipment operator / ground agent requirements definition	
13					process and/or training methodology	130
14					Inadvertent deviation from cleared taxi route	131
15					Lack of English proficiency	132
16 17	-				Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller	133 134
18					Traffic controller tiredness - Inadequate workload distribution	137
19					Lack of adherence to SOP for GND movements. Poor execution of parking / docking	138
13	ldot				/pushback procedure	136
20	1				Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications	140
21	-				Lack of adherence to SOP for GND movements.	141
					Lack of adherence to SOP for GND movements. Lack of awareness of own position on	
22					the airsite and airport topology.	142
23					Lack of adherence to SOP for GND movements. Lack of awareness in terms of	143
_	\vdash				sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current	<u> </u>
24	1				situation on the airsite or / and aircraft / vehicle proximity	144
25					Flaws in traffic controller requirements definition process and/or training	1.45
25					methodology	145
26	\vdash				Lack of or poor communication quality	146
27					Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	148
-	\vdash		<u> </u>		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	\vdash
28					or / and passive contribution to the PF duties	151
29					Current airport diagram not reflecting critical changes	155
30	igspace				Pilot tiredness - Inadequate workload distribution	167
31	\vdash		-		Flaws in pilot requirements definition process and/or training methodology Inadequate certification process and / or flaws in methodology concerning verification	168
32					of the system / product compliance with requirements - marshalling/rolling/taxing	196
		<u> </u>	<u> </u>		control related system and components (incl. brake)	Ľ
					Inadequate certification process and / or flaws in methodology concerning verification	
33					of the system / product compliance with requirements - Ground equipment	261
24						125
34	\vdash				Lack of adherence to emergency procedures - RWY collision avoidance Lack of adherence to SOP for GND movements. Lack of awareness in terms of	135
35					sufficient separation / clearence	143
20					Lack of adherence to SOP for GND movements. Lack of awareness in terms of current	144
36					situation on the airsite or / and aircraft / vehicle proximity	144
37					Pilot tiredness - Inadequate workload distribution	167
38	\vdash				Flaws in pilot requirements definition process and/or training methodology	168
1	33	Inadequate ground crew - flight crew communication	TO36B14	Ground crew fail to cummunicate with flight crew as necessary to avoid conflict	Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129
_		Communication		avoid connect	Flaws in vehicle driver / equipment operator / ground agent requirements definition	
2					process and/or training methodology	130
3					Lack of adherence to SOP for GND movements.	141
4					Adverse weather / poor visibility conditions / darkness	6
5	\vdash				Adverse weather / poor visibility conditions / darkness	6
6					Taxiway incursion Stand confusion	9
	\vdash				Stalia colliusion	
8					Flaws in manufacturer quality control process - taxiing related control system (e.g.	10
					Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure)	124
9					Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure	1
					Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure Lack of adherence to SOP for GND movements in terms of flight crew - ground crew	124 125
10					Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication.	124
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10					Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication. Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	124 125 126 127
10 11 12					Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication. Lack of adherence to SOP for GND movements in terms of clearance providing by the	124 125 126 127 128
10					Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication. Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Flaws in ground equipment maintenance process Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	124 125 126 127
10 11 12					Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication. Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Flaws in ground equipment maintenance process Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition	124 125 126 127 128
10 11 12 13					Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication. Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Flaws in ground equipment maintenance process Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in wehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	124 125 126 127 128 129
10 11 12 13 14					Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication. Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Flaws in ground equipment maintenance process Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Inadvertent deviation from cleared taxi route	124 125 126 127 128 129 130
10 11 12 13 14 15					Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication. Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Flaws in ground equipment maintenance process Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in wehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	124 125 126 127 128 129 130 131 132
10 11 12					Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication. Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Flaws in ground equipment maintenance process Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Inadvertent deviation from cleared taxi route Lack of English proficiency	124 125 126 127 128 129
10 11 12 13 14 15 16					Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication. Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Flaws in ground equipment maintenance process Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Inadvertent deviation from cleared taxi route Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution	124 125 126 127 128 129 130 131 132 133
10 11 12 13 14 15 16 17 18					Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication. Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Flaws in ground equipment maintenance process Vehicle driver / equipment operator / ground agent tiredness - inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Inadvertent deviation from cleared taxi route Lack of fnglish proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Lack of adherence to SOP for GND movements. Poor execution of parking / docking	124 125 126 127 128 129 130 131 132 133 134
10 11 12 13 14 15 16 17 18					Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication. Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication. Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Flaws in ground equipment maintenance process Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Inadvertent deviation from cleared taxi route Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Lack of adherence to SOP for GND movements. Poor execution of parking / docking //pushback procedure	124 125 126 127 128 129 130 131 132 133 134
10 11 12 13 14 15 16 17 18 19					Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication. Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Flaws in ground equipment maintenance process Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Inadvertent deviation from cleared taxi route Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - inadequate workload distribution Lack of adherence to SOP for GND movements. Poor execution of parking / docking /pushback procedure Lack of adherence to SOP for GND movements. Lack of awareness of other traffic	124 125 126 127 128 129 130 131 132 133 134
10 11 12 13 14 15 16 17 18 19					Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication. Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication. Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Flaws in ground equipment maintenance process Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Inadvertent deviation from cleared taxi route Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Lack of adherence to SOP for GND movements. Poor execution of parking / docking //pushback procedure	124 125 126 127 128 129 130 131 132 133 134 137
10 11 12 13 14 15 16 17 18 19 20 21					Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication. Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Flaws in ground equipment maintenance process Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Inadvertent deviation from cleared taxi route Lack of fnglish proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Lack of adherence to SOP for GND movements. Poor execution of parking / docking /pushback procedure Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications	124 125 126 127 128 129 130 131 132 133 134 137 138
10 11 12 13 14 15 16 17 18 19 20					Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication. Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Flaws in ground equipment maintenance process Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Inadvertent deviation from cleared taxi route Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Lack of adherence to SOP for GND movements. Poor execution of parking / docking /pushback procedure Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements.	124 125 126 127 128 129 130 131 132 133 134 137 138
10 11 12 13 14 15 16 17 18 19 20 21					Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication. Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Flaws in ground equipment maintenance process Vehicle driver / equipment operator / ground agent tiredness - inadequate workload distribution Flaws in wehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Inadvertent deviation from cleared taxi route Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - inadequate workload distribution Lack of adherence to SOP for GND movements. Poor execution of parking / docking /pushback procedure Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements.	124 125 126 127 128 129 130 131 132 133 134 137 138
10 11 12 13 14 15 16 17 18 19 20 21 22 23					Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication. Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Flaws in ground equipment maintenance process Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Inadvertent deviation from cleared taxi route Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - inadequate workload distribution Lack of adherence to SOP for GND movements. Poor execution of parking / docking /pushback procedure Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements.	124 125 126 127 128 129 130 131 132 133 134 137 138 140 141
10 11 12 13 14 15 16 17 18 19 20 21 22 23					Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication. Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Flaws in ground equipment maintenance process Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Inadvertent deviation from cleared taxi route Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Lack of adherence to SOP for GND movements. Poor execution of parking / docking /pushback procedure Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications Lack of adherence to SOP for GND movements.	124 125 126 127 128 129 130 131 132 133 134 137 138 140 141
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	Base event	Code	Definition	Identifiable Precursors	No.
				Inadequate certification process and / or flaws in methodology concerning verification	1
33				of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake)	196
34				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment	261
35				Lack of adherence to emergency procedures - RWY collision avoidance	135
26				Lack of adherence to SOP for GND movements. Lack of awareness in terms of	143
30				sufficient separation / clearence	145
27				Lack of adherence to SOP for GND movements. Lack of awareness in terms of current	144
3/				situation on the airsite or / and aircraft / vehicle proximity	144
38				Pilot tiredness - Inadequate workload distribution	167
39				Flaws in pilot requirements definition process and/or training methodology	168



5D 5	Base events Base events	Code	Definition Definition	Identifiable Precursors Identifiable Precursors
	incorrect configuration	Couc	Definition	incorrect configuration
			Co-pilot fails to determine the position of the flap and slats required	
1	Unsuccessful TO configuration checklist	TO05B111	for a successful take-off	Pilot tiredness - Inadequate workload distribution
				Flaws in pilot requirements definition process and/or training methodology
				Lack of adherence to SOP for take-off procedure in terms of determining of aircraft
				configuration.
				Incorrect stab-trim setting
			Captain fails to identify the incorrect position of the flap and slats	Undetected incorrect takeoff configuration
2	Unsuccessful Checklist Verification	TO05B112	determined by co-pilot	Pilot tiredness - Inadequate workload distribution
	Offsuccessful checklist verification	10038112	determined by co-pilot	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring
				or / and passive contribution to the PF duties
				Flaws in pilot requirements definition process and/or training methodology
			Co-pilot fails to enter the correct flap and slat settings into the FMC	
	Flap & slat positions entered into FMC		that the aircraft is incorrectly configured prior to push-back from	
3	incorrectly	TO05B12	the stand	Unintuitive and / or error prone system manual - FMC
				Pilot tiredness - Inadequate workload distribution
				Flaws in pilot requirements definition process and/or training methodology
			Captain fails to perform the take-off configuration check prior to	
4	Verification not conducted	TO05B21	the application of take-off power	Pilot tiredness - Inadequate workload distribution
				Flaws in pilot requirements definition process and/or training methodology
				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring
				or / and passive contribution to the PF duties Lack of adherence to SOP for take-off procedure in terms of checking take-off
				configuration before application of take-off power.
			Captain performs the take-off configuration check but fails to notice	comparation before application of take on power.
5	Verification unsuccessful	TO05B22	that the aircraft is configured incorrectly.	Pilot tiredness - Inadequate workload distribution
		1		Flaws in pilot requirements definition process and/or training methodology
			TOCW system fails due to unsuccessful manufacture and hence the	Inadequate certification process and / or flaws in methodology concerning verification
6	Unsuccessful Manufacture	TO05B311	take-off is not rejected	of the system / product compliance with requirements - TOCW System
				Flaws in manufacturer quality control process - TOCW system components
				System failure affecting aircraft configuration, controllability and/or flying qualities
				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring
				or / and passive contribution to the PF duties
				Unintuitive and / or error prone system manual - ground radar.
				Unintuitive and / or error prone system manual - FMC
				Flaws in pilot requirements definition process and/or training methodology
				Lack of adherence to SOP for take-off procedure in terms of determining of aircraft
				configuration.
				Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.
				Incorrect stab-trim setting
				Undetected incorrect takeoff configuration
			TOCW system fails due to unsuccessful maintenance and hence the	Flaws in maintenance technician / airworthiness specialist requirements definition
7	Unsuccessful Maintenance	TO05B312	take-off is not rejected	process and/or training methodology
			, , , , , , , , , , , , , , , , , , , ,	Maintenance technician / airworthiness specialist tiredness - Inadequate workload
				distribution
				Flaws in aircraft system maintenance process definition - TOCW System
				System failure affecting aircraft configuration, controllability and/or flying qualities
				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring
				or / and passive contribution to the PF duties
				Unintuitive and / or error prone system manual - FMC
				Pilot tiredness - Inadequate workload distribution
				Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft
				configuration.
				Lack of adherence to SOP for take-off procedure in terms of checking take-off
		1		
	I .			
		 		Incorrect stab-trim setting
				configuration before application of take-off power.
			TOCW system fails because the flight crew operate it incorrectly.	configuration before application of take-off power. Incorrect stab-trim setting
			TOCW system fails because the flight crew operate it incorrectly. This includes the failure of the flight crew to check that the TOCW is	configuration before application of take-off power. Incorrect stab-trim setting
			This includes the failure of the flight crew to check that the TOCW is working prior to taxi or the failure of the crew to reset the TOCW	configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration
8	Unsuccessful Operation	TO05B313	This includes the failure of the flight crew to check that the TOCW is	configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration Incorrect use of automation - TOCW System
8	Unsuccessful Operation	TO05B313	This includes the failure of the flight crew to check that the TOCW is working prior to taxi or the failure of the crew to reset the TOCW	configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration Incorrect use of automation - TOCW System Pilot tiredness - Inadequate workload distribution
8	Unsuccessful Operation	T005B313	This includes the failure of the flight crew to check that the TOCW is working prior to taxi or the failure of the crew to reset the TOCW	configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration Incorrect use of automation - TOCW System Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology
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17 18 19 20 21 22 23 24 25 26 27 28			TOPPOSA	Stall occurs at an AOA that is less than the AOA required to activate	System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby instruments Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist triedness - inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Incorrect use of automation - TOCW System Flaws in aircraft system maintenance process definition - TOCW System Unintuitive and / or error prone system manual - TOCW Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components Flaws in manufacturer quality control process - Power supply system components Flaws in aircraft system maintenance process definition - Electrical wiring System	25525 26 149 150 151 167 168 192 204 219 229 230 238 252
17 18 19 20 21 22 23 24 25 26 27 28	21	Stall AOA too low	T005B6212	Stall occurs at an AOA that is less than the AOA required to activate the stick-shaker	System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby instruments Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Incorrect use of automation - TOCW System Flaws in aircraft system maintenance process definition - TOCW System Unintuitive and / or error prone system manual - TOCW Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components Flaws in manufacturer quality control process - Power supply system components Flaws in aircraft system maintenance process definition - Electrical wiring System Contaminated wing	25525 26 149 150 151 167 168 192 204 219 229 230 238 252
17 18 19 20 21 22 23 24 25 26 27 28	21	Stall AOA too low	T00586212	1	System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby instruments Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Incorrect use of automation - TOCW System Flaws in aircraft system maintenance process definition - TOCW System Unintuitive and / or error prone system manual - TOCW Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components Flaws in manufacturer quality control process - Power supply system components Flaws in aircraft system maintenance process definition - Electrical wiring System Contaminated wing Extreme icing conditions encounter	25525 26 149 150 151 167 168 192 204 219 229 230 238 252
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17 18 19 20 21 22 23 24 25 26 27 28	21	Stall AOA too low	T005B6212	1	System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby instruments Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Incorrect use of automation - TOCW System Flaws in aircraft system maintenance process definition - TOCW System Unintuitive and / or error prone system manual - TOCW Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components Flaws in manufacturer quality control process - Power supply system components Flaws in manufacturer quality control process - Power supply system components Flaws in aircraft system maintenance process definition - Electrical wiring System Contaminated wing Extreme icing conditions encounter Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	25525 26 149 150 151 167 168 192 204 219 229 230 238 252 20 151
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9					Incorrect stab-trim setting	258
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1	22	Uncontrollable	TO05B71	the aircraft.	not identifiable at the moment Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	Н
2					or / and passive contribution to the PF duties	151
3					Unintuitive and / or error prone system manual - FMC	217
4					Pilot tiredness - Inadequate workload distribution	167
5					Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft	168
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36 37					Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure. Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT)	210 212
38					Applied de-icing / anti-icing method is not sufficient for predicted conditions	228
39					Lack of adherence to SOP in terms of aircraft icing (condition) monitoring	231
40	22	Lack of control	TO05B72	The pilot makes no attempt to control the aircraft	Lack of adherence to SOP in terms of de-icing / anti-icing procedures.	232
	23	Lack Of COULTO	1003072	The pilot makes no attempt to control the aircraft.	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168
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1 2 3 4 5 6 7					Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	167 168 198 201



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19 20				Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168
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10				Applied de-icing / anti-icing method is not sufficient for predicted conditions	228
11				Lack of adherence to SOP in terms of aircraft icing (condition) monitoring	231
12				Lack of adherence to SOP in terms of de-icing / anti-icing procedures.	232
1 24 Inc	correct Control	TO05B73	The pilot applies incorrect control to the aircraft. This can be due to improper training, stress and fatigue	Flaws in pilot requirements definition process and/or training methodology	168
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4				Inadequate stall recovery procedure for the aircraft	152
				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
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7				Pilot tiredness - Inadequate workload distribution	167
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9				Lack of adherence to SOP for take-off procedure in terms of checking take-off	198
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23 24 25 26 27 77 28 8				Flaws in aircraft system maintenance process definition - Electrical wiring System Contaminated wing Extreme icing conditions encounter System failure affecting the operation of primary instruments / displays or standby instruments Flaws in aircraft system maintenance process definition - stickshaker Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	252 12 20 26 136
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223 244 255 25 266 277 288 29 29 6 6 311 312 22 2				Flaws in aircraft system maintenance process definition - Electrical wiring System Contaminated wing Extreme icing conditions encounter System failure affecting the operation of primary instruments / displays or standby instruments Flaws in aircraft system maintenance process definition - stickshaker Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - stickshaker system	252 12 20 26 136 149
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39					Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.	210
40					Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT)	212
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3 4 1 2 3 4 4 5 6 7 8 9 1 1 2 3 3 4 4 1 2 3 3 4 4 1 2 3 3 4 4 5 6 6 6 7 8 8 8 9 9 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1	Pilot failure to follow take-off 3 instructions Separation Infringement with 4 Departing Aircraft caused by other a/c Separation Infringement with Landing	TO02B1112 TO02B11211	leads to misunderstanding, and which causes a potential hazardous encounter Flight crew fails to carry out the instruction given by ATCO and which causes a potential hazardous encounter Aircraft loses separation with an aircraft departing which is caused by the other aircraft Aircraft loses separation with an aircraft departing which is caused by the other aircraft	Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Flaws in traffic controller requirements definition process and/or training methodology Lack of English proficiency Incorrect or confusing / misleading ATC instructions	139 145 132 133 134 137 145 146 148 167 168 296 140 142 143 144 167 168 296 367
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15 16					decision Late rejected takeoff decision / initiation	207 368
17					Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations	384
IV						
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Ш						
+ II + I	IV	Failure to Achieve Maximum Braking			Failure to Achieve Maximum Braking	
П				The runway is too short under wet or icy runway conditions for the		
1	11	Insufficient Runway Length	TO03B41	plane to come to a halt even if the take-off is aborted before V1 is reached.	Convective weather - heavy rain resulted with wet RWY surface	75
2	11	insumcient Kunway Length	1003841	reactieu.	Pilot tiredness - Inadequate workload distribution	167
3					Flaws in pilot requirements definition process and/or training methodology	168
4					Gross error in takeoff weight entry and/or in V1 / VR speeds assessment Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of	179
					RWY surface condition. Snow / ice presence / or runway surface friction rate below	
5					minimum	203
6					High energy RTO rate is an indicator of improper Operator's policy for T/O operations.	211
7					Poor application of T/O & RTO procedure, computation of T/O parameters	260
8					Convective weather / turbulence / windshear or crosswind conditions during take-off	32
Ť					Adverse weather in terms of heavy rain or icing conditions resulted with decreased	
9					RWY surface friction rate	45
10					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
11					Pilot tiredness - Inadequate workload distribution	167
12					Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft	168
13					handling	200
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					Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below	
15					minimum	203
10					Failure to remember / assess crosswind component limit for prevailing runway	440
16 17					condition Pilot tiredness - Inadequate workload distribution	418 167
18					Flaws in pilot requirements definition process and/or training methodology	168
19					Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207
20					Late rejected takeoff decision / initiation	368
21					Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations	384
22 23			-		Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168
24					Poor application of T/O & RTO procedure, aircraft handling	388
1	12	Brakes not functioning correctly	TO03B42	Brakes are not giving maximum braking, i.e. because of improper maintenance and damages	System failure affecting aircraft configuration, controllability and/or flying qualities	25
2	12	brakes not functioning correctly	1003642	maintenance and damages	Contaminated Runway	39
					Flaws in maintenance technician / airworthiness specialist requirements definition	
3			-		process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	149
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_					Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence	246
5					of contaminations. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing	216
6					control related system and components (incl. brake).	366
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8					RWY surface friction rate	45
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10					Pilot tiredness - Inadequate workload distribution	167
11					Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft	168
12					handling	200
13					Lack of adherence to AFM limitations for Take-off	202
					Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below	
14					minimum	203
1.					Failure to remember / assess crosswind component limit for prevailing runway condition	440
15 16					Pilot tiredness - Inadequate workload distribution	418 167
17					Flaws in pilot requirements definition process and/or training methodology	168
18					Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207
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23					Poor application of T/O & RTO procedure, aircraft handling	388
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2	13	Brakes not applied correctly	1003043	inincurately after take-Off rejection.	Flaws in pilot requirements definition process and/or training methodology	168
					Poor application of T/O & RTO procedure, braking initiation sequence	199
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					Adverse weather in terms of heavy rain or icing conditions resulted with decreased	1 0
3					RWY surface friction rate	45
4					RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	
3 4 5 6 7					RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution	151 167
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3 4 5 6 7					RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution	151 167



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					Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of	
11					RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum	203
11					Failure to remember / assess crosswind component limit for prevailing runway	203
12					condition	418
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14					Flaws in pilot requirements definition process and/or training methodology	168
4.5					Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP	207
15 16					decision Late rejected takeoff decision / initiation	368
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18					Pilot tiredness - Inadequate workload distribution	167
19					Flaws in pilot requirements definition process and/or training methodology	168
20					Poor application of T/O & RTO procedure, aircraft handling	388
V +	.,	Failure to maintain control			Failure to maintain control	
H	V	railure to maintain control		No input to controls will allow the pilot to maintain control of the	Failure to maintain control	\vdash
1	14	Uncontrollable	TO03B51	aircraft when take-off continued	not identifiable at the moment	
П						
2					Convective weather / turbulence / windshear or crosswind conditions during take-off	32
3					Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate	45
3					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	45
4					or / and passive contribution to the PF duties	151
5					Pilot tiredness - Inadequate workload distribution	167
6					Flaws in pilot requirements definition process and/or training methodology	168
T					Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft	
7 8			+		handling	200
8			+		Lack of adherence to AFM limitations for Take-off Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of	202
					RWY surface condition. Snow / ice presence / or runway surface friction rate below	
9			1		minimum	203
					Failure to remember / assess crosswind component limit for prevailing runway	
10			1		condition	418
				The pilot makes no attempt to control the aircraft when take-off		4.57
1 2	15	Lack of control	TO03B52	continued	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168
3			+		Poor application of T/O & RTO procedure, aircraft handling	388
Ť						1.22
4					Convective weather / turbulence / windshear or crosswind conditions during take-off	32
					Adverse weather in terms of heavy rain or icing conditions resulted with decreased	
5					RWY surface friction rate	45
6					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
7					Pilot tiredness - Inadequate workload distribution	167
8					Flaws in pilot requirements definition process and/or training methodology	168
					Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft	
9					handling	200
10					Lack of adherence to AFM limitations for Take-off	202
					Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below	
11					minimum	203
					Failure to remember / assess crosswind component limit for prevailing runway	203
12					condition	418
				The pilot applies incorrect control to the aircraft when take-off		
1	16	Incorrect Control	TO03B53	continued. This can be due to improper training, stress and fatigue	Pilot tiredness - Inadequate workload distribution	167
2 3					Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling	168 388
					1 our application of 170 & 110 procedure, aircraft flatiding	300
4					Convective weather / turbulence / windshear or crosswind conditions during take-off	32
					Adverse weather in terms of heavy rain or icing conditions resulted with decreased	
5					RWY surface friction rate	45
٠					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	
6 7			+		or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution	151 167
8			1		Flaws in pilot requirements definition process and/or training methodology	168
-					Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft	m
9					handling	200
10					Lack of adherence to AFM limitations for Take-off	202
			1		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of	
11			1		RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum	203
11			+		Failure to remember / assess crosswind component limit for prevailing runway	203
12			1		condition	418
П				The pilot applies correct measures but are not enough to prevent		
1	17	Insufficient control	TO03B54	aircraft leaving off the side of the runway	Pilot tiredness - Inadequate workload distribution	167
2			+		Flaws in pilot requirements definition process and/or training methodology	168
3			+		Poor application of T/O & RTO procedure, aircraft handling	388
4			1		Convective weather / turbulence / windshear or crosswind conditions during take-off	32
					Adverse weather in terms of heavy rain or icing conditions resulted with decreased	
5					RWY surface friction rate	45
					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	1.7
6 7			+		or / and passive contribution to the PF duties	151
8			+		Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168
٥			+		Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft	100
			<u>1 </u>		handling	200
9					Lack of adherence to AFM limitations for Take-off	202
9 10					Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of	1
-			I			
10					RWY surface condition. Snow / ice presence / or runway surface friction rate below	202
-					minimum	203
10						203 418
10	I	Directional control systems failure			minimum Failure to remember / assess crosswind component limit for prevailing runway	
10	I 1	Directional control systems failure Main Gear Failure	T004B111	Failure of any part of the main gear	minimum Failure to remember / assess crosswind component limit for prevailing runway condition	



3 4 4 5 5 6 6 7 7 1 1 2 2 3 3 4 4 5 5 6 6 7 7 1 1 5 5 6 6 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	2 Nose Gear Failure 2 Brake System Failure	T004B112	Failure of any part of the nose gear including the steering system	Flaws in akintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. System failure affecting aircraft configuration, controllability and/or flying qualities Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	149 150 358 377 376 25 80
4 5 6 6 7 1 1 2 2 3 3 4 4 1 1 1 2 2 3 3 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4		T004B112	Failure of any part of the nose gear including the steering system	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. System failure affecting aircraft configuration, controllability and/or flying qualities Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	358 377 376 25 80
5 5 6 7 7 1 2 2 3 3 4 4 4 5 5 6 6 7 7 7 1 1 2 2 3 3 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4		T004B112	Failure of any part of the nose gear including the steering system	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. System failure affecting aircraft configuration, controllability and/or flying qualities Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	358 377 376 25 80
6 7 1 1 2 2 3 3 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4		T004B112	Failure of any part of the nose gear including the steering system	of the system / product compliance with requirements - Landing gear components Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. System failure affecting aircraft configuration, controllability and/or flying qualities Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	358 377 376 25 80
6 7 1 1 2 2 3 3 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4		T004B112	Failure of any part of the nose gear including the steering system	Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. System failure affecting aircraft configuration, controllability and/or flying qualities Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	377 376 25 80
1 2 3 4 4 5 5 6 6 7 7 1 1 2 2 3 3 4 4		T004B112	Failure of any part of the nose gear including the steering system	System failure affecting aircraft configuration, controllability and/or flying qualities Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	25 80
2 3 4 5 6 7 7 1 2 3			Tamate of any part of the most gear meading are securing system	Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	80
4 5 6 7 1 2 3	3 Brake System Failure			process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	140
4 5 6 7 1 2 3	3 Brake System Failure			Maintenance technician / airworthiness specialist tiredness - Inadequate workload	
5 6 7 1 2 3	3 Brake System Failure			distribution	143
1 2 3 4	3 Brake System Failure			1	150
1 2 3 4	3 Brake System Failure			Inadequate certification process and / or flaws in methodology concerning verification	
1 2 3 4	3 Brake System Failure			of the system / product compliance with requirements - Landing gear components	358
3	3 Brake System Failure			Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components.	377 376
3	3 Brake System Failure		Failure in any part of the brake system that results in asymmetric		
3		TO04B121	braking force being applied to the wheels and hence causes directional instability	System failure affecting aircraft configuration, controllability and/or flying qualities	25
3				Flaws in maintenance technician / airworthiness specialist requirements definition	
4		_	+	process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	149
5				distribution	150
5				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing	
5				control related system and components (incl. brake)	196
1				Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake).	366
- 1				Flaws in manufacturer quality control process - marshalling/rolling/taxiing control	
6 1	4 Tyre Failure	TO04B122	Failure of a tyre, i.e. bursting or delamination	related system and components (incl. brake). System failure affecting aircraft configuration, controllability and/or flying qualities	365 25
2	. , ye runure	. 5046122	- 2	Tire burst	80
3				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
3				Maintenance technician / airworthiness specialist tiredness - Inadequate workload	149
4				distribution	150
				Inadequate certification process and / or flaws in methodology concerning verification	
5				of the system / product compliance with requirements - Landing gear components	358
6 7		_	+	Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components.	377 376
			Failure of any part of the wheel excluding tyre or braking system,		
2	5 Wheel Sub-Assembly Failure	TO04B123	i.e. an axle failure or wheel rim failure	System failure affecting aircraft configuration, controllability and/or flying qualities Tire burst	25 80
				Flaws in maintenance technician / airworthiness specialist requirements definition	
3		_		process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	149
4				distribution	150
				Inadequate certification process and / or flaws in methodology concerning verification	
5				of the system / product compliance with requirements - Landing gear components	358
6 7				Flaws in aircraft system maintenance process definition - Landing gear components.	377 376
+				Flaws in manufacturer quality control process - Landing gear components.	376
П	Take-off rejection		The wiles take of the second to the discretized and the second to the	Take-off rejection	Ш
			The pilot either fails to realise the directional control system failure is the cause of the handling problems or diagnoses the failure as		
			something else, perhaps more serious and as a result aborts the		
2	6 Pilot Misdiagnosis	TO04B211	take-off.	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168
3				Poor application of T/O & RTO procedure, failure recognition and preparedness	209
5				System failure affecting aircraft configuration, controllability and/or flying qualities Tire burst	25 80
				Flaws in maintenance technician / airworthiness specialist requirements definition	
6				process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	149
7				distribution	150
				Inadequate certification process and / or flaws in methodology concerning verification	
8				of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake)	196
9				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
10				Flaws in aircraft system maintenance process definition - Landing gear components.	377
11				Flaws in manufacturer quality control process - Landing gear components. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing	376
12				control related system and components (incl. brake).	366
13				Flaws in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake).	365
1.3			The pilot diagnoses the situation, realising that a directional control		303
1	7 Dilat Misjudgan	TO040343	related system failure has resulted in handling problems but	Dilet tiredness I hadequate workland distribution	1
2	7 Pilot Misjudgement	TO04B212	misjudges the situation and incorrectly aborts the take-off.	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168
				Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP	
4				decision System failure affecting aircraft configuration, controllability and/or flying qualities	207 25
5				Tire burst	80
6				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
				Maintenance technician / airworthiness specialist tiredness - Inadequate workload	
				distribution Inadequate certification process and / or flaws in methodology concerning verification	150
7	1			of the system / product compliance with requirements - marshalling/rolling/taxiing	
7				control related system and components (incl. brake)	196



				precursors and CATS base Events		
					Inadequate certification process and / or flaws in methodology concerning verification	
9					of the system / product compliance with requirements - Landing gear components	358
10					Flaws in aircraft system maintenance process definition - Landing gear components.	377
11					Flaws in manufacturer quality control process - Landing gear components.	376
12					Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake).	366
12					Flaws in manufacturer quality control process - marshalling/rolling/taxiing control	300
13					related system and components (incl. brake).	365
				If the take-off is rejected when the aircraft is below V1 then this is a		
1		Take-off rejected correctly when below V1	TO04B22	success, but it must be included to obtain the pivotal event probability.	not identifiable at that lelvel	
2		VI	1004622	probability.	System failure affecting aircraft configuration, controllability and/or flying qualities	25
3					Tire burst	80
П					Flaws in maintenance technician / airworthiness specialist requirements definition	
4					process and/or training methodology	149
5					Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
3					Inadequate certification process and / or flaws in methodology concerning verification	130
					of the system / product compliance with requirements - marshalling/rolling/taxiing	
6					control related system and components (incl. brake)	196
7					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
8					Flaws in aircraft system maintenance process definition - Landing gear components.	377
9					Flaws in manufacturer quality control process - Landing gear components.	376
LΤ					Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing	
10					control related system and components (incl. brake). Flaws in manufacturer quality control process - marshalling/rolling/taxiing control	366
11					related system and components (incl. brake).	365
H					,	200
Ш						
+ II		Failure to maintain control (take-off				
+1	III	rejected)		No input to controls will allow the pilot to maintain control of the	Failure to maintain control (take-off rejected)	\dashv
1	q	Uncontrollable	TO04B31	aircraft with speed less than V1	not identifiable at the moment	
2					System failure affecting aircraft configuration, controllability and/or flying qualities	25
3					Tire burst	80
					Flaws in maintenance technician / airworthiness specialist requirements definition	
4					process and/or training methodology	149
5					Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
Ť					Inadequate certification process and / or flaws in methodology concerning verification	
					of the system / product compliance with requirements - marshalling/rolling/taxiing	
6					control related system and components (incl. brake)	196
					Inadequate certification process and / or flaws in methodology concerning verification	
7					of the system / product compliance with requirements - Landing gear components	358
8					Flaws in aircraft system maintenance process definition - Landing gear components.	377
9					Flaws in manufacturer quality control process - Landing gear components.	376
					Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing	
10			-		control related system and components (incl. brake). Flaws in manufacturer quality control process - marshalling/rolling/taxiing control	366
11					related system and components (incl. brake).	365
12					Pilot tiredness - Inadequate workload distribution	167
13					Flaws in pilot requirements definition process and/or training methodology	168
١					Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP	207
14 15					decision Poor application of T/O & RTO procedure, failure recognition and preparedness	207 209
13				The pilot makes no attempt to control the aircraft with speed less	r oor application or 170 & 110 procedure, failure recognition and preparedness	203
1	10	Lack of control	TO04B32	than V1	Pilot tiredness - Inadequate workload distribution	167
2					Flaws in pilot requirements definition process and/or training methodology	168
3					Poor application of T/O & RTO procedure, aircraft handling	388
4 5					System failure affecting aircraft configuration, controllability and/or flying qualities Tire burst	25 80
Ť					Flaws in maintenance technician / airworthiness specialist requirements definition	
6					process and/or training methodology	149
IJ			_		Maintenance technician / airworthiness specialist tiredness - Inadequate workload]
7					distribution Inadequate certification process and / or flaws in methodology concerning verification	150
Ш					of the system / product compliance with requirements - marshalling/rolling/taxiing	
8					control related system and components (incl. brake)	196
ıΤ						٦
			1	1	Inadequate certification process and / or flaws in methodology concerning verification	
۸					of the system / product compliance with requirements 1 = dis-	250
9					of the system / product compliance with requirements - Landing gear components Flaws in aircraft system maintenance process definition - Landing gear components.	358 377
9 10 11					of the system / product compliance with requirements - Landing gear components Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components.	358 377 376
10 11					Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing	377 376
10					Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake).	377
10 11 12					Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake). Flaws in manufacturer quality control process - marshalling/rolling/taxiing control	377 376 366
10 11 12					Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake).	377 376 366 365
10 11 12					Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake). Flaws in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake).	377 376 366
10 11 12 13 14 15					Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake). Flaws in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake). Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP	377 376 366 365 167 168
10 11 12 13 14 15					Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake). Flaws in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake). Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	377 376 366 365 167 168
10 11 12 13 14 15				The nilot anniles incorrect control to the sizeraft which has record	Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake). Flaws in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake). Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP	377 376 366 365 167 168
10 11 12 13 14 15				The pilot applies incorrect control to the aircraft, which has speed less than V1. This can be due to improper training, stress and	Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake). Flaws in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake). Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	377 376 366 365 167 168
10 11 12 13 14 15	11	Incorrect Control	TO04833		Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake). Flaws in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake). Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	377 376 366 365 167 168 207 209
10 11 12 13 14 15 16 17	11	Incorrect Control	TO04B33	less than V1. This can be due to improper training, stress and	Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake). Flaws in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake). Fliot tiredness - inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Poor application of T/O & RTO procedure, failure recognition and preparedness Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	377 376 366 365 167 168 207 209
10 11 12 13 14 15 16 17 1 1 2	11	Incorrect Control	TO04B33	less than V1. This can be due to improper training, stress and	Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake). Flaws in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake). Fliour in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake). Fliour tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Poor application of T/O & RTO procedure, failure recognition and preparedness Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling	377 376 366 365 167 168 207 209 167 168 388
10 11 12 13 14 15 16 17 1 1 2 3 4	11	Incorrect Control	TO04B33	less than V1. This can be due to improper training, stress and	Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake). Flaws in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake). Pilot tiredness - inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Poor application of T/O & RTO procedure, failure recognition and preparedness Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling System failure affecting aircraft configuration, controllability and/or flying qualities	377 376 366 365 167 168 207 209 167 168 388 25
10 11 12 13 14 15 16 17 1 1 2	11	Incorrect Control	TO04B33	less than V1. This can be due to improper training, stress and	Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake). Flaws in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake). Fliour in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake). Fliour tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Poor application of T/O & RTO procedure, failure recognition and preparedness Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling	377 376 366 365 167 168 207 209 167 168 388
10 11 12 13 14 15 16 17 1 1 2 3 4	111	Incorrect Control	TO04B33	less than V1. This can be due to improper training, stress and	Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake). Flaws in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake). Fliavs in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake). Fliavs in pilot trequirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Poor application of T/O & RTO procedure, failure recognition and preparedness Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling System failure affecting aircraft configuration, controllability and/or flying qualities Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	377 376 366 365 167 168 207 209 167 168 388 25
10 11 12 13 14 15 16 17 1 1 2 3 4	11	Incorrect Control	TO04B33	less than V1. This can be due to improper training, stress and	Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in imanufacturer quality control process - Landing gear components. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake). Flaws in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake). Fliour in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake). Fliour tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Poor application of T/O & RTO procedure, failure recognition and preparedness Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling System failure affecting aircraft configuration, controllability and/or flying qualities Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition	377 376 366 365 167 168 207 209 167 168 388 25 80



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The second power incompanies with register of the register of process and register completes with register completes and the regi	8					control related system and components (incl. brake)	196
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6					process and/or training methodology	149
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6					Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
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3					configuration.	198
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5				Captain fails to identify the incorrect position of the flap and slats	Undetected incorrect takeoff configuration	259
1	2	Unsuccessful Checklist Verification	TO05B112	determined by co-pilot	Pilot tiredness - Inadequate workload distribution	167
П					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	
3					or / and passive contribution to the PF duties	151
3				Co-pilot fails to enter the correct flap and slat settings into the FMC	Flaws in pilot requirements definition process and/or training methodology	100
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13					Undetected incorrect takeoff configuration	259
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1	13	Pilot Misjudgement	TO05B412	allows the aircraft to reach V1 before incorrectly aborting the take- off	Cautions / warnings (genuine or spurious) that may lead to a low-speed or high- speed rejected take-off	46
2	13	Priot iviisjuugement	10036412	011	Pilot tiredness - Inadequate workload distribution	167
3					Flaws in pilot requirements definition process and/or training methodology	168
П					Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP	
4					decision	207
5					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
6					Unintuitive and / or error prone system manual - FMC	217
7					Pilot tiredness - Inadequate workload distribution	167
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9					Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.	198
9					Lack of adherence to SOP for take-off procedure in terms of checking take-off	196
10					configuration before application of take-off power.	201
11					Incorrect stab-trim setting	258
12				I fabra and a refficient control of the control of	Undetected incorrect takeoff configuration	259
		Take-off rejected correctly when below		If the take-off is rejected when the aircraft is below V1 then this is a success, but it must be included to obtain the pivotal event		
1	14	V1	TO05B42	probability.	not identifiable at the moment	
П					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	
2					or / and passive contribution to the PF duties	151
3 4			-		Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution	217 167
5					Flaws in pilot requirements definition process and/or training methodology	168
7					Lack of adherence to SOP for take-off procedure in terms of determining of aircraft	
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9					Undetected incorrect takeoff configuration	259
IV+						П
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	IV	Failure to achieve maximum braking		The suppose is too short under just as is a suppose conditions for the	Failure to achieve maximum braking	\vdash
				The runway is too short under wet or icy runway conditions for the plane to come to a halt even if the take-off is aborted before V1 is	Adverse weather in terms of heavy rain or icing conditions resulted with decreased	
1	15	Insufficient Runway Length	TO05B51	reached.	RWY surface friction rate	45
2					Pilot tiredness - Inadequate workload distribution	167
3					Flaws in pilot requirements definition process and/or training methodology	168
4					Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling	200
۳					Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of	200
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5					minimum	203
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11					Pilot tiredness - Inadequate workload distribution	167
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15					Incorrect stab-trim setting	258
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17			1		Cautions / warnings (genuine or spurious) that may lead to a low-speed or high- speed rejected take-off	46
H					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	m
18					or / and passive contribution to the PF duties	151
19					Pilot tiredness - Inadequate workload distribution	167
20			 		Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP	168
21			1		decision	207
П				Brakes are not giving maximum braking, e.g. because of improper		
1	16	Brakes not functioning correctly	TO05B52	maintenance and damages	System failure affecting aircraft configuration, controllability and/or flying qualities	25
2			-		Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168
э					Flaws in aircraft system maintenance process and/or training methodology	100
4					control related system and components (incl. brake).	366
Т					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	
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7			 		Pilot tiredness - Inadequate workload distribution	167
					Flaws in pilot requirements definition process and/or training methodology	168
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9 10 11					Incorrect stab-trim setting Undetected incorrect takeoff configuration Cautions / warnings (genuine or spurious) that may lead to a low-speed or high- speed rejected take-off	258
9 10 11 12					Incorrect stab-trim setting Undetected incorrect takeoff configuration Cautions / warnings (genuine or spurious) that may lead to a low-speed or high- speed rejected take-off Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	258 259 46
9 10 11 12					Incorrect stab-trim setting Undetected incorrect takeoff configuration Cautions / warnings (genuine or spurious) that may lead to a low-speed or high- speed rejected take-off	258 259



1 I					Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP	
17				Failure of the flight crew to apply all the braking systems	decision	20
1	17	Brakes not applied correctly	TO05B53	immediately after take-off rejection.	Pilot tiredness - Inadequate workload distribution	16
2					Flaws in pilot requirements definition process and/or training methodology	16
3					Poor application of T/O & RTO procedure, braking initiation sequence	19
4					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	15
5					Unintuitive and / or error prone system manual - FMC	21
6					Pilot tiredness - Inadequate workload distribution	16
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12					speed rejected take-off	4
					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	
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14					Pilot tiredness - Inadequate workload distribution	16
15					Flaws in pilot requirements definition process and/or training methodology	16
16					Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	20
10					decision	20
V+I						
+II \	v	Aircraft stalls after rotation			Aircraft stalls after rotation	
1	18	Stall Unavoidable	TO05B61	No input to controls will allow the flight crew to avoid the stall	not identifiable at that level	
\top					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	
2					or / and passive contribution to the PF duties	15
3					Unintuitive and / or error prone system manual - FMC	21
4 5					Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	16
3			+		Lack of adherence to SOP for take-off procedure in terms of determining of aircraft	10
6					configuration.	19
					Lack of adherence to SOP for take-off procedure in terms of checking take-off	
7					configuration before application of take-off power.	20
8					Incorrect stab-trim setting	25
9					Undetected incorrect takeoff configuration	25
10					System failure affecting aircraft configuration, controllability and/or flying qualities	2
					System failure affecting the operation of primary instruments / displays or standby	١.,
11	_				instruments Flaws in maintenance technician / airworthiness specialist requirements definition	2
12					process and/or training methodology	14
					Maintenance technician / airworthiness specialist tiredness - Inadequate workload	
13					distribution	150
					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	
14					or / and passive contribution to the PF duties	15
15					Pilot tiredness - Inadequate workload distribution	16
16					Flaws in pilot requirements definition process and/or training methodology	16
17 18					Incorrect use of automation - TOCW System	19: 20:
19					Flaws in aircraft system maintenance process definition - TOCW System Unintuitive and / or error prone system manual - TOCW	219
13					Inadequate certification process and / or flaws in methodology concerning verification	21.
20					of the system / product compliance with requirements - TOCW System	22
T					Inadequate certification process and / or flaws in methodology concerning verification	
					of the system / product compliance with requirements - Power supply system	
21					components	23
22					Flaws in manufacturer quality control process - Power supply system components	23
23					Flaws in aircraft system maintenance process definition - Electrical wiring System	25
1	10	Pilot ignores stickshaker	TO05B622	Flight crew take no action to the activated stick-shaker	Lack of adherence to SOP in terms of awareness on supporting systems warning - stickshaker	19
2	13	g strensmantel	. 5055022	5 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	Pilot tiredness - Inadequate workload distribution	, 20
3			_			16
\neg				<u> </u>	Flaws in pilot requirements definition process and/or training methodology	16 16
- 1					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	16
4					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	16
5					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC	15
6					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution	15 21 16
-					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	15
6					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution	15 21 16
6					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft	15: 21: 16: 16:
6 7 8					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	15: 21: 16: 16: 19:
6 7 8 9					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	166 157 167 168 198 207 258
6 7 8 9 10					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration	15: 21: 16: 16: 19: 20: 25: 25:
6 7 8 9					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration System failure affecting aircraft configuration, controllability and/or flying qualities	166 157 167 168 198 207 258
6 7 8 9 10 11 12					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby	150 151 161 161 190 201 255 255 255 255
6 7 8 9 10					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby instruments	15: 21: 16: 16: 19: 20: 25: 25:
6 7 8 9 10 11 12					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby	150 151 161 161 190 201 255 255 255 255
6 7 8 9 10 11 12					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby instruments Flaws in maintenance technician / airworthiness specialist requirements definition	155 211 166 166 196 200 255 255 25 20
6 7 8 9 10 11 12					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby instruments Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	155 211 166 166 196 200 255 255 25 20
6 7 8 9 10 11 12 13					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby instruments Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	166 155 211 166 196 205 255 255 25 25 21 144
9 10 11 12 13 14					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby instruments Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	166 155 211 166 190 200 255 255 25 25 25 25 25 25 25 25 25 25 2
6 7 8 9 10 11 12 13 14 15 16					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby instruments Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution	166 155 211 166 199 200 255 255 25 25 25 25 25 25 25 25 25 25 2
9 10 11 12 13 14 15 16 17 18					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby instruments Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Flaws in pilot requirements definition process and/or training methodology	166 155 211 166 196 205 255 255 29 20 144 156 166 166
9 10 11 12 13 14 15 16 17 18 19					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby instruments Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Incorrect use of automation - TOCW System	166 155 211 166 166 200 255 255 25 21 20 144 156 166 166 196
9 10 11 12 13 14 15 16 17 18 19 20					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby instruments Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Incorrect use of automation - TOCW System Flaws in aircraft system maintenance process definition - TOCW System	166 155 211 166 166 200 255 255 21 149 156 166 166 199 200
9 10 11 12 13 14 15 16 17 18 19					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby instruments Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Incorrect use of automation - TOCW System Unintuitive and / or error prone system manual - TOCW	166 155 211 166 166 205 255 25 25 25 25 149 156 166 166 199 200 219
6 7 8 9 10 11 12 13 14 15 16 17 18 19 20					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby instruments Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Incorrect use of automation - TOCW System Flaws in aircraft system maintenance process definition - TOCW System	166 155 211 166 166 205 255 25 25 25 25 149 156 166 166 199 200 219
9 10 11 12 13 14 15 16 17 18 19 20 21					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby instruments Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Incorrect use of automation - TOCW System Flaws in aircraft system maintenance process definition - TOCW System Unintuitive and / or error prone system manual - TOCW Inadequate certification process and / or flaws in methodology concerning verification	166 157 211 166 192 200 255 255 21 144 156 166 169 190 201 201 201 201 201 201 201 201 201 20
13 14 15 16 17 18 19 20 21					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting aircraft configuration, sontrollability and/or flying qualities System failure affecting methodology Maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Incorrect use of automation - TOCW System Unintuitive and / or error prone system manual - TOCW Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system	163 153 164 163 200 255 255 255 26 144 156 166 193 200 214 225
9 10 11 12 13 14 15 16 17 18 19 20 21					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby instruments Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Incorrect use of automation - TOCW System Unintuitive and / or error prone system manual - TOCW Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System Inadequate certification process and / or flaws in methodology concerning verification inadequate certification process and / or flaws in methodology concerning verification	166 157 211 166 192 200 255 255 21 144 156 166 169 190 201 201 201 201 201 201 201 201 201 20



1	20	Stick shaker failure	TO05B6211	Stick-shaker fails due to improper manufacture or maintenance	System failure affecting the operation of primary instruments / displays or standby instruments	2
2	20	Stick Stiaker failure	100380211	Suck-shaker rails due to improper manufacture or maintenance	Flaws in aircraft system maintenance process definition - stickshaker	13
3					Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	14
					Maintenance technician / airworthiness specialist tiredness - Inadequate workload	1.5
4					distribution Inadequate certification process and / or flaws in methodology concerning verification	150 1
_					of the system / product compliance with requirements - stickshaker system components	16
5 6					Flaws in manufacturer quality control process - Stickshaker system components	26
					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	
7 8					or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC	15 21
9					Pilot tiredness - Inadequate workload distribution	16
10					Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft	16
11					configuration.	19
12					Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	20
13					Incorrect stab-trim setting	25
14					Undetected incorrect takeoff configuration	25
15					System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby	2
16					instruments	2
17					Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	14
П					Maintenance technician / airworthiness specialist tiredness - Inadequate workload	
18					distribution	15
19					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	15
20					Pilot tiredness - Inadequate workload distribution	16
21 22					Flaws in pilot requirements definition process and/or training methodology Incorrect use of automation - TOCW System	16 19
23					Flaws in aircraft system maintenance process definition - TOCW System	20
24					Unintuitive and / or error prone system manual - TOCW Inadequate certification process and / or flaws in methodology concerning verification	21
25					of the system / product compliance with requirements - TOCW System	22
					Inadequate certification process and / or flaws in methodology concerning verification	1
26					of the system / product compliance with requirements - Power supply system components	23
27					Flaws in manufacturer quality control process - Power supply system components	23
28				Stall occurs at an AOA that is less than the AOA required to activate	Flaws in aircraft system maintenance process definition - Electrical wiring System	25
1	21	Stall AOA too low	TO05B6212	the stick-shaker	Contaminated wing	1
2					Extreme icing conditions encounter System failure affecting the operation of primary instruments / displays or standby	20
3					instruments	2
4 5					Inadequate aircraft de-icing / anti-icing	18
6					Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.	20
7					Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT)	24
						21
8					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - antiice fluid HOT	n 21
9					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - antiice fluid HOT Applied de-icing / anti-icing method is not sufficient for predicted conditions	21
9 10					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - antiice fluid HOT	21 22 23
9 10 11					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - antiice fluid HOT Applied de-icing / anti-icing method is not sufficient for predicted conditions Lack of adherence to SOP in terms of aircraft icing monitoring Lack of adherence to SOP in terms of de-icing / anti-icing procedures. Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	21 22 23 23
9 10 11					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - antiice fluid HOT Applied de-icing / anti-icing method is not sufficient for predicted conditions Lack of adherence to SOP in terms of aircraft icing monitoring Lack of adherence to SOP in terms of de-icing / anti-icing procedures.	21 22 23 23 15
9 10 11 12 13					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - antiice fluid HOT Applied de-icing / anti-icing method is not sufficient for predicted conditions Lack of adherence to SOP in terms of aircraft icing monitoring Lack of adherence to SOP in terms of de-icing / anti-icing procedures. Lack of adherence to SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - inadequate workload distribution	21 22 23 23 23 15 21 16
9 10 11 12 13					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - antiice fluid HOT Applied de-icing / anti-icing method is not sufficient for predicted conditions Lack of adherence to SOP in terms of aircraft icing monitoring Lack of adherence to SOP in terms of de-icing / anti-icing procedures. Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	21 22 23 23 23 15 21 16
9 10 11 12 13 14 15					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - antiice fluid HOT Applied de-icing / anti-icing method is not sufficient for predicted conditions Lack of adherence to SOP in terms of aircraft icing monitoring Lack of adherence to SOP in terms of de-icing / anti-icing procedures. Lack of adherence to SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.	21 22 23 23 23 15 21 16
9 10 11 12 13 14 15					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - antiice fluid HOT Applied de-icing / anti-icing method is not sufficient for predicted conditions Lack of adherence to SOP in terms of aircraft icing monitoring Lack of adherence to SOP in terms of de-icing / anti-icing procedures. Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off	21 22 23 23 23 15 21 16 16
9 10 11 12 13 14 15 16					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - antiice fluid HOT Applied de-icing / anti-icing method is not sufficient for predicted conditions Lack of adherence to SOP in terms of aircraft icing monitoring Lack of adherence to SOP in terms of de-icing / anti-icing procedures. Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting	21 22 23 23 23 15 21 16 16 16 19
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149	38 39 40 41 1 2: 2 3 3 4 5 6 7 8 9 10 11 12	3 Lack of control	TO05B72	The pilot makes no attempt to control the aircraft.	Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure. Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT) Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - antiice fluid HOT Applied de-icing / anti-icing method is not sufficient for predicted conditions Lack of adherence to SOP in terms of aircraft icing monitoring Lack of adherence to SOP in terms of de-icing / anti-icing procedures. Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to AFM in terms of emergency procedures - stall recovery Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby	213 228 231 232 167 168 292 151 217 167 168 292 258 259 255 255
Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties 151 172 183 191 191 192 193 194 195 197 197 198 199 199 199 190 100 100 100	38 39 40 41 1 2: 2 3 3 4 5 6 7 8 9 10 11 12	3 Lack of control	TO05872	The pilot makes no attempt to control the aircraft.	Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure. Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT) Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - antice fluid HOT Applied de-icing / anti-icing method is not sufficient for predicted conditions Lack of adherence to SOP in terms of aircraft icing monitoring Lack of adherence to SOP in terms of de-icing / anti-icing procedures. Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to AFM in terms of emergency procedures - stall recovery Lack of adherence to AFM in terms of emergency procedures - stall recovery Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby instruments	213 228 231 232 167 168 292 151 217 167 168 292 258 259 255 255
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Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties 151 17 Pilot tiredness - Inadequate workload distribution 167 18 Pilot tiredness - Inadequate workload distribution 167 18 Pilot tiredness - Inadequate workload distribution 167 18 Pilot tiredness - Inadequate workload distribution 167 19 Pilot tiredness - Inadequate workload distribution 167 19 Pilot tiredness - Inadequate workload distribution 167 19 Pilot tiredness - Inadequate workload distribution 167 20 Pilot tiredness - Inadequate occupance sand/or training methodology 168 21 Pilot tiredness - Inadequate cartification - TOCW System 192 22 Pilot tiredness - Power supply system 192 23 Pilot tiredness - Power supply system 193 24 Pilot tiredness - Power supply system 193 25 Pilot tiredness - Power supply system 193 26 Pilot tiredness - Power supply system 193 27 Pilot tiredness - Power supply system 193 28 Pilot tiredness - Power supply system 193 29 Pilot tiredness - Power supply system 193 29 Pilot tiredness - Power supply system 194 29 Pilot tiredness - Power supply system 194 29 Pilot tiredness - Power supply system 195 29 Pilot tiredness - Power supply system 195 29 Pilot tiredness - Power supply system 195 29 Pilot tiredness - Power supply system 195 29 Pilot tiredness - Power supply system 195 29 Pilot tiredness - Power supply system 195 29 Pilot tiredness - Power supply system 195 29 Pilot tiredness - Power supply system 195 29 Pilot tiredness - Power supply system 195 29 Pilot tiredness - Power supply system 195 29 Pilot tiredness - Power supply system 195 29 Pilot tiredness - Power supply system 195 29 Pilot tiredness - Power supply system 195 29 Pilot tiredness - Power supply system 195 29 Pilot tiredness - Power supply system 195 29 Pilot tiredness - Power supply system 195 29 Pilot tiredness - Power supply system 195 29 Pilot tiredness - Power supply system 195 29 Pilot tiredness - Power s	38 39 40 41 1 2: 2 3 3 4 5 6 6 7 7 8 8	3 Lack of control	TO05B72	The pilot makes no attempt to control the aircraft.	Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure. Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT) Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - antitice fluid HOT Applied de-icing / anti-icing method is not sufficient for predicted conditions Lack of adherence to SOP in terms of aircraft icing monitoring Lack of adherence to SOP in terms of aircraft icing monitoring Lack of adherence to SOP in terms of de-icing / anti-icing procedures. Pilot tirechess - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to AFM in terms of emergency procedures - stall recovery Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tirechess - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting ircraft configuration, ontrollability and/or flying qualities System failure affecting ircraft configuration of primary instruments / displays or standby instruments Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	210 212 213 228 231 232 167 168 292 151 217 167 168 198 201 258 259 25
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Pilot tiredness - Inadequate workload distribution 167	38 39 40 41 1 23 3 4 5 6 7 8 9 10 11 12 13 14	3 Lack of control	TO05B72	The pilot makes no attempt to control the aircraft.	Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure. Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT) Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - antice fluid HOT Applied de-icing / anti-icing method is not sufficient for predicted conditions Lack of adherence to SOP in terms of aircraft icing monitoring Lack of adherence to SOP in terms of de-icing / anti-icing procedures. Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to AFM in terms of emergency procedures - stall recovery Lack of adherence to AFM in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby instruments Flaws in maintenance technician / airworthiness specialist trediress - Inadequate workload distribution	210 212 213 228 231 232 167 168 292 151 217 167 168 198 201 258 259 25 26
Flaws in pilot requirements definition process and/or training methodology 168 Incorrect use of automation - TOCW System 192 Flaws in aircraft system maintenance process definition - TOCW System 204 Unintuitive and / or error prone system manual - TOCW 219 Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System 229 Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system 229 Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system 229 Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system 229 Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system 229 Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system 229 Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system 229 Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system 229 Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system 229 Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system 229 Inadequate certification process and / or flaws in	38 39 40 41 1 2: 2 2 3 3 4 5 6 6 7 7 8 8 9 10 111 122 131 14	3 Lack of control	TO05B72	The pilot makes no attempt to control the aircraft.	Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure. Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT) Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - antice fluid HOT Applied de-icing / anti-icing method is not sufficient for predicted conditions Lack of adherence to SOP in terms of aircraft icing monitoring Lack of adherence to SOP in terms of de-icing / anti-icing procedures. Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to AFM in terms of emergency procedures - stall recovery Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration System failure affecting aircraft configuration your part of the splays or standby instruments Flaws in minitenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tredness - inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	210 212 213 228 231 167 168 292 151 217 167 168 198 201 258 259 25 26 149
192 20 Incorrect use of automation - TOCW System	38 39 40 41 1 23 3 4 5 6 7 8 9 10 11 12 13 14	B Lack of control	TO05872	The pilot makes no attempt to control the aircraft.	Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure. Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT) Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - antice fluid HOT Applied de-icing / anti-icing method is not sufficient for predicted conditions Lack of adherence to SOP in terms of aircraft icing monitoring Lack of adherence to SOP in terms of de-icing / anti-icing procedures. Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to AFM in terms of emergency procedures - stall recovery Lack of adherence to AFM in terms of emergency procedures - stall recovery Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby instruments Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution or / and passive contribution to the PF duties	210 212 213 228 231 167 168 292 151 217 167 168 292 201 201 258 259 25 25 26 149
Flaws in aircraft system maintenance process definition - TOCW System 204	38 39 40 41 1 2: 2 2 3 3 4 5 6 7 7 8 9 10 11 11 12 13 14	3 Lack of control	TO05B72	The pilot makes no attempt to control the aircraft.	Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure. Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT) Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - antice fluid HOT Applied de-icing / anti-icing method is not sufficient for predicted conditions Lack of adherence to SOP in terms of aircraft icing monitoring Lack of adherence to SOP in terms of de-icing / anti-icing procedures. Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to AFM in terms of emergency procedures - stall recovery Lack of adherence to AFM in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting ircraft configuration, controllability and/or flying qualities System failure affecting incorrect configuration of primary instruments / displays or standby instruments Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	210 212 213 228 231 231 232 167 168 292 151 217 168 201 258 259 25 26 149 150
Unintuitive and / or error prone system manual - TOCW 219	38 39 40 41 1 2: 2 3 3 4 5 6 6 7 8 9 10 11 11 12 13 14 14 15	3 Lack of control	TO05B72	The pilot makes no attempt to control the aircraft.	Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure. Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT) Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - antitice fluid HOT Applied de-icing / anti-icing method is not sufficient for predicted conditions Lack of adherence to SOP in terms of aircraft icing monitoring Lack of adherence to SOP in terms of aircraft icing monitoring Lack of adherence to SOP in terms of de-icing / anti-icing procedures. Pilot tirechess - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to AFM in terms of emergency procedures - stall recovery Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tirechess - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting methodology Maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technican / airworthiness specialist requirements definition process and/or training methodology Maintenance technican / airworthiness specialist requirements of pilot trequirements definition process and/or training methodology	210 212 213 228 231 232 167 168 292 151 217 167 168 292 259 25 25 25 25 26 149 150
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229 of the system / product compliance with requirements - TOCW System 229 lnadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components of the system / product compliance with requirements - Power supply system components compone	38 39 40 41 1 2: 2 2 3 3 4 5 6 7 7 8 8 9 10 111 112 13 14 15 16 17 18 19 19 20	3 Lack of control	TO05B72	The pilot makes no attempt to control the aircraft.	Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure. Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT) Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - antice fluid HOT Applied de-icing / anti-icing method is not sufficient for predicted conditions Lack of adherence to SOP in terms of aircraft icing monitoring Lack of adherence to SOP in terms of de-icing / anti-icing procedures. Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to AFM in terms of emergency procedures - stall recovery Lack of adherence to AFM in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trins etting Undetected incorrect takeoff configuration System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting incraft configuration, controllability and/or flying qualities System failure affecting incraft configuration, controllability and/or flying qualities System failure affecting incraft configuration, controllability and/or flying qualities System failure affecting incraft configuration of primary instruments / displays or standby instruments Flaws in maintenance technician / airworthiness specialist tredness - inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the P	210 212 213 228 231 232 167 168 292 151 217 167 168 259 25 26 149 150 151 167 168
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Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components.	3 3 4 5 5 1 1 2 2 3 3 4 4 5 5 5 6 6 7 7	2	Unsuccessful Maintenance Unsuccessful Manufacture and Maintenance	TO09812 TO09813	Maintenance on the engine is not conducted or conducted incorrectly, an incorrect modification is made or the manufacturer's guidelines are inadequate such that the maintenance performed is incorrect Engine is both unsuccessfully manufactured and where maintenance fails to detect the defect that arise from manufacturing Engine ingests objects such as debris left on the runway by other	Flaws in manufacturer quality control process - Engine systems and / or components Flaws in aircraft system maintenance process definition - Engine systems and / or components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in aircraft system maintenance process definition - Engine systems and / or components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in inarcraft system maintenance process definition - Engine systems and / or components Flaws in inarcraft system maintenance process definition - Engine systems and / or components Wildlife incursion Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence	149 150 454 463 149 150 454 463 5 34 463 149 150
10 integrity monitoring 11 Flaws in aircraft system maintenance process definition - Landing gear components. 12 Flaws in manufacturer quality control process - Landing gear components.	3 3 4 5 5 1 1 2 2 3 3 4 4 5 5 5 6 6 7 7 8 8	2	Unsuccessful Maintenance Unsuccessful Manufacture and Maintenance	TO09812 TO09813	Maintenance on the engine is not conducted or conducted incorrectly, an incorrect modification is made or the manufacturer's guidelines are inadequate such that the maintenance performed is incorrect Engine is both unsuccessfully manufactured and where maintenance fails to detect the defect that arise from manufacturing Engine ingests objects such as debris left on the runway by other	Flaws in manufacturer quality control process - Engine systems and / or components Flaws in aircraft system maintenance process definition - Engine systems and / or components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in aircraft system maintenance process definition - Engine systems and / or components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in aircraft system maintenance process definition - Engine systems and / or components Flaws in incraft system maintenance process definition - Engine systems and / or components Wildlife incursion Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist requirements definition process and/or definition or airworthiness specialist requirements definition procedure Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.	458 463 149 150 454 463 149 150 454 463 5 34 463 149 150 162 216
Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components.	3 3 4 5 5 1 1 2 2 3 3 4 4 5 5 5 6 6 7 7 8 8	2	Unsuccessful Maintenance Unsuccessful Manufacture and Maintenance	TO09812 TO09813	Maintenance on the engine is not conducted or conducted incorrectly, an incorrect modification is made or the manufacturer's guidelines are inadequate such that the maintenance performed is incorrect Engine is both unsuccessfully manufactured and where maintenance fails to detect the defect that arise from manufacturing Engine ingests objects such as debris left on the runway by other	Flaws in manufacturer quality control process - Engine systems and / or components Flaws in aircraft system maintenance process definition - Engine systems and / or components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components flaws in manufacturer quality control process - Engine systems and / or components Flaws in aircraft system maintenance process definition - Engine systems and / or components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in aircraft system maintenance process definition - Engine systems and / or components Wildlife incursion Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist tredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction process and/or training methodology Maintenance technician / airworthiness specialist tredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear component	149 150 454 458 463 149 150 454 458 463 5 34 39 80 149 150 162 216
12 Flaws in manufacturer quality control process - Landing gear components.	3 3 4 5 5 1 2 2 3 3 4 4 5 5 5 6 6 7 7 8 8 9 9	2	Unsuccessful Maintenance Unsuccessful Manufacture and Maintenance	TO09812 TO09813	Maintenance on the engine is not conducted or conducted incorrectly, an incorrect modification is made or the manufacturer's guidelines are inadequate such that the maintenance performed is incorrect Engine is both unsuccessfully manufactured and where maintenance fails to detect the defect that arise from manufacturing Engine ingests objects such as debris left on the runway by other	Flaws in manufacturer quality control process - Engine systems and / or components Flaws in aircraft system maintenance process definition - Engine systems and / or components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in aircraft system maintenance process definition - Engine systems and / or components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in aircraft system maintenance process definition - Engine systems and / or components Wildlife incursion Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist requirements of indequate workload distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Inadequate certification process and / or flaws in methodolog	149 150 454 463 149 150 454 463 149 150 454 458 463 5 34 149 150 162 216
	3	2	Unsuccessful Maintenance Unsuccessful Manufacture and Maintenance	TO09812 TO09813	Maintenance on the engine is not conducted or conducted incorrectly, an incorrect modification is made or the manufacturer's guidelines are inadequate such that the maintenance performed is incorrect Engine is both unsuccessfully manufactured and where maintenance fails to detect the defect that arise from manufacturing Engine ingests objects such as debris left on the runway by other	Flaws in manufacturer quality control process - Engine systems and / or components Flaws in aircraft system maintenance process definition - Engine systems and / or components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in aircraft system maintenance process definition - Engine systems and / or components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in aircraft system maintenance process definition - Engine systems and / or components Flaws in inraraft system maintenance process definition - Engine systems and / or components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist requirements definition process and/or training methodology Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - p	458 463 149 150 454 463 149 150 454 463 5 34 463 149 150 162 216
II+ Flight crew rejects take-off Flight crew rejects take-off	3	2	Unsuccessful Maintenance Unsuccessful Manufacture and Maintenance	TO09812 TO09813	Maintenance on the engine is not conducted or conducted incorrectly, an incorrect modification is made or the manufacturer's guidelines are inadequate such that the maintenance performed is incorrect Engine is both unsuccessfully manufactured and where maintenance fails to detect the defect that arise from manufacturing Engine ingests objects such as debris left on the runway by other	Flaws in manufacturer quality control process - Engine systems and / or components Flaws in aircraft system maintenance process definition - Engine systems and / or components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in in manufacturer quality control process - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in marufacturer quality control process - Engine systems and / or components Fla	149 150 454 458 463 149 150 454 458 463 5 34 458 463 149 150 162 216
	3	3	Unsuccessful Maintenance Unsuccessful Manufacture and Maintenance Foreign Object Damage	TO09812 TO09813	Maintenance on the engine is not conducted or conducted incorrectly, an incorrect modification is made or the manufacturer's guidelines are inadequate such that the maintenance performed is incorrect Engine is both unsuccessfully manufactured and where maintenance fails to detect the defect that arise from manufacturing Engine ingests objects such as debris left on the runway by other	Flaws in manufacturer quality control process - Engine systems and / or components Flaws in aircraft system maintenance process definition - Engine systems and / or components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in aircraft system maintenance process definition - Engine systems and / or components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in aircraft system maintenance process definition - Engine systems and / or components Flaws in aircraft system maintenance process definition - Engine systems and / or components Wildlife incursion Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist requirements definition process and/or training methodology Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction proceedure Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring Flaws in manufacturer quality control process - Landing gear components. Flaws in manufacturer quality control process - Landing g	149 150 454 463 149 150 150 454 463 54 463 54 39 80 149 150 162 216 358 401 377



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			The pilot either misdiagnoses the situation or misunderstands the effects caused by a single engine failure, and hence incorrectly		
1	5 Pilot Misdiagnosis	TO09B211	aborts the take-off.	Pilot tiredness - Inadequate workload distribution	1
2	5 Thot Wisdiagnosis	10038211	abouts the take on.	Flaws in pilot requirements definition process and/or training methodology	1
3				Poor application of T/O & RTO procedure, failure recognition and preparedness	2
4				Wildlife incursion	T
5				Bird strike	Т
6				Contaminated Runway	П
7				Tire burst	
				Flaws in maintenance technician / airworthiness specialist requirements definition	
8				process and/or training methodology	1
				Maintenance technician / airworthiness specialist tiredness - Inadequate workload	
9				distribution	1
10				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction	١.
10				procedure Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence	1
11				of contaminations.	2
11		+		or contaminations.	ť
				Inadequate certification process and / or flaws in methodology concerning verification	,
12				of the system / product compliance with requirements - Landing gear components	3
				Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence	T
13				integrity monitoring	4
				Inadequate certification process and / or flaws in methodology concerning verification	ı
				of the system / product compliance with requirements - Engine systems and / or	
14				components	4
L5				Flaws in manufacturer quality control process - Engine systems and / or components	4
Т				Flaws in aircraft system maintenance process definition - Engine systems and / or	Г
L6				components	4
L7				Flaws in aircraft system maintenance process definition - Landing gear components.	3
18				Flaws in manufacturer quality control process - Landing gear components.	3
Т			The flight crew diagnoses the engine failure but misjudges the		Г
1	6 Pilot Misjudgement	TO09B212	situation and incorrectly aborts the take-off	Pilot tiredness - Inadequate workload distribution	1
2				Flaws in pilot requirements definition process and/or training methodology	1
				Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP	
3				decision	2
4				Wildlife incursion	Į.
5				Bird strike	╀
6		1		Contaminated Runway	L
7		1		Tire burst	F
				Flaws in maintenance technician / airworthiness specialist requirements definition	
8				process and/or training methodology	1
				Maintenance technician / airworthiness specialist tiredness - Inadequate workload	ı
9				distribution	1
_				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction	١.
10				procedure	1
				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence	١.
11				of contaminations.	2
12		1		Inadequate certification process and / or flaws in methodology concerning verification	
12		+	 	of the system / product compliance with requirements - Landing gear components	3
				Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence	١.
13				integrity monitoring	4
				Inadequate certification process and / or flaws in methodology concerning verification	1
				of the system / product compliance with requirements - Engine systems and / or	1.
14		1		components Flaws in manufacturer quality control process - Engine systems and / or components	4
٠٠			•		
				Flaws in aircraft system maintenance process definition. Engine systems and / or	۳
6				Flaws in aircraft system maintenance process definition - Engine systems and / or	T
				components	4
L7				components Flaws in aircraft system maintenance process definition - Landing gear components.	4
L7			If the take-off is rejected when the aircraft is below V1 than this is	components Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components.	4
17	Take-off rejected correctly when halo	w	If the take-off is rejected when the aircraft is below V1 then this is auccess, but it must be included to obtain the pivotal event	components Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components.	4
17 18	Take-off rejected correctly when bel		success, but it must be included to obtain the pivotal event	components Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components.	4 3
17	Take-off rejected correctly when beli	w TO09B22		components Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. a not identifiable at that level	4
7 8 1 2			success, but it must be included to obtain the pivotal event	components Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. not identifiable at that level Wildlife incursion	3
7 8 1 2			success, but it must be included to obtain the pivotal event	components Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. a not identifiable at that level	3 3
7 8 1 2 3 4			success, but it must be included to obtain the pivotal event	components Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. a not identifiable at that level Wildlife incursion Bird strike	4 3 3
7 8 1 2 3 4			success, but it must be included to obtain the pivotal event	components Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. a not identifiable at that level Wildlife incursion Bird strike Contaminated Runway	4 3 3
7 8 1 2 3 4 5			success, but it must be included to obtain the pivotal event	components Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. not identifiable at that level Wildlife incursion Bird strike Contaminated Runway Tire burst	3 3
7 8 1 2 3 4 5			success, but it must be included to obtain the pivotal event	components Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. anot identifiable at that level Wildlife incursion Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition	3 3
7 8 1 2 3 4 5			success, but it must be included to obtain the pivotal event	components Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. a not identifiable at that level Wildlife incursion Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	1
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7 8 1 2 3 4 5			success, but it must be included to obtain the pivotal event	components Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. not identifiable at that level Wildlife incursion Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	1
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1 1 2 3 4 5 6			success, but it must be included to obtain the pivotal event	components Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. not identifiable at that level Wildlife incursion Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.	1 1 2
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3	-			Given that the speed bugs have been correctly determined, flight	Flaws in pilot requirements definition process and/or training methodology
		Speed settings incorrectly entered into		crew enter the settings incorrectly and these are verified by the	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring
L		FMC	TO10B113	captain during the taxi checklist	or / and passive contribution to the PF duties
2					Pilot tiredness - Inadequate workload distribution
3	\Box				Flaws in pilot requirements definition process and/or training methodology
	۔ ا			Flight crew applies inappropriate inputs to the flight controls	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring
	5 1	Unsuccessful Pitch Control Inputs	TO10B12	causing pitch control problems and resulting in difficulty taking off.	or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution
					Flaws in pilot requirements definition process and/or training methodology
					Lack of adherence to SOP for take-off procedure in terms of checking take-off
					configuration before application of take-off power.
					Slow rotation (i.e., low pitch rate)
				Unsuccessful design of one of the integral components causes the	System failure affecting the operation of primary instruments / displays or standby
	6	Unsuccessful Design	TO10B1311	failure of a flight control system	instruments
					Inadequate certification process and / or flaws in methodology concerning verification
					of the system / product compliance with requirements - FCS system or components
				Unsuccessful manufacture of one of the integral components	System failure affecting the operation of primary instruments / displays or standby
	7 1	Unsuccessful Manufacture	TO10B1312	causes the failure of a flight control system	instruments
	_			Marinton and the flight and a large in and and a set of a	Flaws in manufacturer quality control process - FCS system components
				Maintenance of the flight control system is not conducted or not successfully completed such that one of the flight control system	System failure affecting the operation of primary instruments / displays or standby
		Unsuccessful Maintenance	TO10B1313	fails	instruments
	- 0 '	Offsuccessful Maintenance	101001313	ialis	Flaws in maintenance technician / airworthiness specialist requirements definition
				Ì	process and/or training methodology
	\dashv		1		Maintenance technician / airworthiness specialist tiredness - Inadequate workload
				Ì	distribution
	\neg				
					Flaws in aircraft system maintenance process definition - FCS systems or components
	Т			A foreign object strikes one of the control surfaces rendering it	
	9 1	Foreign Object Damage	TO10B1314	ineffective. Such objects include birds and runway debris	Wildlife incursion
	4			ļ	Bird strike
	_			ļ	Contaminated Runway
	\dashv		 	ļ	Tire burst
					Flaws in maintenance technician / airworthiness specialist requirements definition
	\dashv		-	+	process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload
					distribution
	\dashv			<u> </u>	Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction
				Ì	procedure
	\neg				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence
					of contaminations.
					Inadequate certification process and / or flaws in methodology concerning verification
	_				of the system / product compliance with requirements - Landing gear components
					Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence
	-				integrity monitoring
	-				Flaws in aircraft system maintenance process definition - Landing gear components.
	-			Given the occurrence of a flight control system failure, the failure is	Flaws in manufacturer quality control process - Landing gear components. System failure affecting the operation of primary instruments / displays or standby
	10	Severe Flight Control System Failure	TO10B132	severe enough to cause a pitch control problem	instruments
	10.	Severe Fright Control System Fandre	10100132	severe enough to cause a piten control problem	Slow rotation (i.e., low pitch rate)
					Inadequate certification process and / or flaws in methodology concerning verification
					of the system / product compliance with requirements - FCS system or components
					Flaws in manufacturer quality control process - FCS system components
					Flaws in aircraft system maintenance process definition - FCS systems or components
		Flight crew rejects to take-off			Flight crew rejects to take-off
				The pilot misdiagnoses the situation and either fails to realise what	
	11	Crow Misdiagnosa Situation	TO10B211	is causing the pitch control problems or wrongly attributes them to something else.	Pilot tiredness - Inadequate workload distribution
	11	Crew Misdiagnose Situation	.0100211	Jonnessing Cisc.	Flaws in pilot requirements definition process and/or training methodology
	\dashv			<u> </u>	Poor application of T/O & RTO procedure, failure recognition and preparedness
	\dashv			<u> </u>	Wildlife incursion
	\neg				System failure affecting the operation of primary instruments / displays or standby
	_			<u> </u>	instruments
	┚				Bird strike
	J				Contaminated Runway
	[Tire burst
				Ì	Flaws in maintenance technician / airworthiness specialist requirements definition
	\dashv		 	ļ	process and/or training methodology
				Ì	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution
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			I .	1	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties
	+				or / and passive contribution to the FF duties
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			1	The runway is too short under wet or icy runway conditions for the	1	_
				plane to come to a halt even if the take-off is aborted before V1 is		
1	14	Insufficient Runway Length	TO10B31	reached.	Convective weather - heavy rain resulted with wet RWY surface	75
2					Pilot tiredness - Inadequate workload distribution	167
3					Flaws in pilot requirements definition process and/or training methodology	168
4			+		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of	1/5
					RWY surface condition. Snow / ice presence / or runway surface friction rate below	
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7					Poor application of T/O & RTO procedure, computation of T/O parameters Wildlife incursion	260
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9					instruments	26
10					Bird strike	34
11					Contaminated Runway	39
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14					distribution	150
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1				Brakes are not giving maximum braking, i.e. because of improper		
2	15	Brakes not functioning correctly	TO10B32	maintenance and damages	System failure affecting aircraft configuration, controllability and/or flying qualities	25
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26 27 28 29 30 31 IV+		Aircraft fails to rotate and lift off Pitch Control Misdiagnosed	T010841	Flight crew fail to diagnose the cause of the pitch control problems and hence fails to rectify the problem.	Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Pilot triedness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Poor application of T/O & RTO procedure, failure recognition and preparedness Aircraft fails to rotate and lift off Pilot tiredness - Inadequate workload distribution	422 377 376 167 168
26 27 28 29 30 31 IV+ I I			TO10B41		Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Fliot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Poor application of T/O & RTO procedure, failure recognition and preparedness Aircraft fails to rotate and lift off Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	422 377 376 167 168 207 209
26 27 28 29 30 31 IV+ I I 2			TO10841		Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Poor application of T/O & RTO procedure, failure recognition and preparedness Aircraft fails to rotate and lift off Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling	422 377 376 167 168 207 209 167 168 388
26 27 28 29 30 31 IV+ I I			TO10B41		Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Pilot trienders - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Poor application of T/O & RTO procedure, failure recognition and preparedness Aircraft fails to rotate and lift off Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling Wildlife incursion	422 377 376 167 168 207 209
26 27 28 29 30 31 IV+ I I 2			T010841		Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Poor application of T/O & RTO procedure, failure recognition and preparedness Aircraft fails to rotate and lift off Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling	422 377 376 167 168 207 209 167 168 388
26 27 28 29 30 31 IV+ I I 2 3 4			TO10B41		Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Fliot triedness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Poor application of T/O & RTO procedure, failure recognition and preparedness Aircraft fails to rotate and lift off Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling Wildlife incursion System failure affecting the operation of primary instruments / displays or standby instruments Bird strike	422 377 376 167 168 207 209 167 168 388 5 26 34
26 27 28 29 30 31 IV+ I I 2 3 4 5 6			TO10841		Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Pilot trienders - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Poor application of T/O & RTO procedure, failure recognition and preparedness Aircraft fails to rotate and lift off Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling Wildlife incursion System failure affecting the operation of primary instruments / displays or standby linstruments Bird strike Contaminated Runway	422 377 376 167 168 207 209 167 168 388 5 26 34 39
26 27 28 29 30 31 IV+ I I 2 3 4			TO10841		Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Fliotit triendess - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Poor application of T/O & RTO procedure, failure recognition and preparedness Aircraft fails to rotate and lift off Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling Wildlife incursion System failure affecting the operation of primary instruments / displays or standby instruments Bird strike Contaminated Runway Tire burst	422 377 376 167 168 207 209 167 168 388 5 26 34
26 27 28 29 30 31 IV+ I I 2 3 4 5 6			TO10B41		Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Fliot triedness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Poor application of T/O & RTO procedure, failure recognition and preparedness Aircraft fails to rotate and lift off Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling Wildlife incursion System failure affecting the operation of primary instruments / displays or standby instruments Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition	422 377 376 167 168 207 209 167 168 388 5 26 34 39
26 27 28 29 30 31 IV+ 1 1 2 3 4 5 6			TO10841		Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Fliotit triendess - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Poor application of T/O & RTO procedure, failure recognition and preparedness Aircraft fails to rotate and lift off Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling Wildlife incursion System failure affecting the operation of primary instruments / displays or standby instruments Bird strike Contaminated Runway Tire burst	422 377 376 167 168 207 209 167 168 388 5 26 34 39 80
26 27 28 29 30 31 IV+ I I 2 3 4 5 6 7			TO10B41		Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Fliot triedness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Poor application of T/O & RTO procedure, failure recognition and preparedness Aircraft fails to rotate and lift off Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling Wildlife incursion System failure affecting the operation of primary instruments / displays or standby instruments Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	422 377 376 167 168 207 209 167 168 388 5 26 34 39 80
26 27 28 29 30 31 IV+ I I 1 2 3 4 5 6 7 8			TO10B41		Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Poor application of T/O & RTO procedure, failure recognition and preparedness Aircraft fails to rotate and lift off Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling Wildlife incursion Wildlife incursion System failure affecting the operation of primary instruments / displays or standby instruments Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	422 377 167 168 207 209 167 168 388 5 26 34 39 80 149
26 27 28 29 30 31 IV+ I I 2 3 4 5 6 7			TO10841		Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Poor application of T/O & RTO procedure, failure recognition and preparedness Aircraft fails to rotate and lift off Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling Wildlife incursion System failure affecting the operation of primary instruments / displays or standby instruments Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance techniclan / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	422 377 376 167 168 207 209 167 168 388 5 26 34 39 80
26 27 28 29 30 31 1V+ 1 1 2 3 4 5 6 7 8 9			TO10B41		Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Poor application of T/O & RTO procedure, failure recognition and preparedness Aircraft fails to rotate and lift off Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling Wildlife incursion Wildlife incursion System failure affecting the operation of primary instruments / displays or standby instruments Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	422 377 376 167 168 207 209 167 168 388 5 26 34 39 80 149
26 27 28 29 30 31 IV+ I I I 22 3 4 4 5 6 7 8 8 9 10 10			TO10841		Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Fliot triedness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Poor application of T/O & RTO procedure, failure recognition and preparedness Aircraft fails to rotate and lift off Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling Wildlife incursion System failure affecting the operation of primary instruments / displays or standby instruments Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction	422 377 167 168 207 209 167 168 388 5 26 34 39 80 149
26 27 28 29 30 31 IV+ I I 2 3 4 5 6 7 8 9			TO10B41		Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Fliot triedness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Poor application of T/O & RTO procedure, failure recognition and preparedness Aircraft fails to rotate and lift off Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling Wildlife incursion System failure affecting the operation of primary instruments / displays or standby instruments Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Flaws in pilot requirements definition process and/or training methodology Flaws in pilot requirements definition process and/or training methodology	422 377 376 167 168 207 209 167 168 388 5 26 34 39 80 149 150
26 27 28 29 30 31 IV+ I I 1 2 3 4 5 6 7 8 9 10 11 12 13			TO10B41		Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Fliot triedness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Poor application of T/O & RTO procedure, failure recognition and preparedness Aircraft fails to rotate and lift off Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling Wildlife incursion System failure affecting the operation of primary instruments / displays or standby instruments Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft	422 377 376 167 168 207 209 167 168 388 5 5 26 34 39 80 149 150 151
26 27 28 29 30 31 1 V+ 1 I 2 3 4 5 6 7 8 9 10			TO10841		Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Fliotit triedness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Poor application of T/O & RTO procedure, failure recognition and preparedness Aircraft fails to rotate and lift off Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling Wildlife incursion System failure affecting the operation of primary instruments / displays or standby instruments Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.	422 377 376 167 168 207 209 167 168 388 5 26 34 39 80 150 151
26 27 28 29 30 31 IV+ I I 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 18 18 18 18 18 18 18 18 18			TO10841		Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Fliot triendess - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Poor application of T/O & RTO procedure, failure recognition and preparedness Aircraft fails to rotate and lift off Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling Wildlife incursion System failure affecting the operation of primary instruments / displays or standby instruments Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off	167 168 207 209 167 168 388 5 26 34 39 80 150 151 162 167 168
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26 27 28 29 30 31 IV+ I I 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17			TO10B41		Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Fliot triendess - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Poor application of T/O & RTO procedure, failure recognition and preparedness Aircraft fails to rotate and lift off Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling Wildlife incursion System failure affecting the operation of primary instruments / displays or standby instruments Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before a DICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.	167 168 207 209 167 168 338 5 26 34 39 80 149 150 151 162 167 168 198 201
26 27 28 29 30 31 IV+ I 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16			TO10B41		Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Poor application of T/O & RTO procedure, failure recognition and preparedness Aircraft fails to rotate and lift off Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling Wildlife incursion System failure affecting the operation of primary instruments / displays or standby instruments Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	167 168 207 168 207 168 388 5 5 26 34 39 80 149 150 151 162 167 168
26 27 28 29 30 31 IV+ I I 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17			TO10841		Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Poor application of T/O & RTO procedure, failure recognition and preparedness Aircraft fails to rotate and lift off Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling Wildlife incursion System failure affecting the operation of primary instruments / displays or standby instruments Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.	167 168 207 209 167 168 338 5 26 34 39 80 149 150 151 162 167 168 198 201
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26 27 28 29 30 31 IV+ I I 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17			TO10841		Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Poor application of T/O & RTO procedure, failure recognition and preparedness Aircraft fails to rotate and lift off Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling Wildlife incursion System failure affecting the operation of primary instruments / displays or standby instruments Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.	167 168 207 209 167 168 338 5 26 34 39 80 149 150 151 162 167 168 198 201
26 27 28 30 31 1 IV+ 1 1 2 3 3 4 5 6 6 7 8 8 9 10 11 12 13 14 15 16			TO10B41		Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Poor application of T/O & RTO procedure, failure recognition and preparedness Aircraft fails to rotate and lift off Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling Wildlife incursion System failure affecting the operation of primary instruments / displays or standby instruments Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to ISOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Incorrect stab-trim setting Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	167 168 207 209 167 168 388 5 26 34 39 149 150 151 162 167 168 201 216 258 358 371
26 27 28 30 31 1 IV+ 1 1 2 3 3 4 5 6 6 7 8 8 9 10 11 12 13 14 15 16			TO10B41		Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Flioti triendess - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Poor application of T/O & RTO procedure, failure recognition and preparedness Aircraft fails to rotate and lift off Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling Wildlife incursion System failure affecting the operation of primary instruments / displays or standby instruments Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tredness - inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Pilot tiredness - Inadequate workload distribution Itaks of adherence to ICAO Annex 14 SARPs in terms of determining of aircraft configuration. Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Incorrect stab-trim setting Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Slow rotation (i.e., low pitch rate) Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence in	167 168 207 209 167 168 388 5 26 34 39 80 149 150 151 162 167 168 198 201 201 201 203
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					Inadequate certification process and / or flaws in methodology concerning verification	
23					of the system / product compliance with requirements - FCS system or components	420
24					Flaws in manufacturer quality control process - FCS system components	421
-						Ħ
25					Flaws in aircraft system maintenance process definition - FCS systems or components	
26					Flaws in aircraft system maintenance process definition - Landing gear components.	377
27					Flaws in manufacturer quality control process - Landing gear components.	376
				Flight crew diagnoses the causes of the pitch control problem but		1 1
1	18 Unsucessfi	ul Pitch Control Rectification	TO10B42	fails to rectify it	Pilot tiredness - Inadequate workload distribution	167
2					Flaws in pilot requirements definition process and/or training methodology	168
3					Poor application of T/O & RTO procedure, aircraft handling	388
4					Wildlife incursion	5
5					System failure affecting the operation of primary instruments / displays or standby	26
					instruments	26
6 7			-		Bird strike	34
8			1		Contaminated Runway Tire burst	39 80
8						80
9					Flaws in maintenance technician / airworthiness specialist requirements definition	4.0
9					process and/or training methodology	149
10					Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
10					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	
11					or / and passive contribution to the PF duties	151
11					Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction	151
12					procedure	162
13					Pilot tiredness - Inadequate workload distribution	167
14					Flaws in pilot requirements definition process and/or training methodology	168
14					Lack of adherence to SOP for take-off procedure in terms of determining of aircraft	100
15					configuration.	198
13					Lack of adherence to SOP for take-off procedure in terms of checking take-off	156
16					configuration before application of take-off power.	201
10					Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence	_
17					of contaminations.	216
18					Incorrect stab-trim setting	258
-					incorrect stab trim setting	-230
					Inadequate certification process and / or flaws in methodology concerning verification	,
19					of the system / product compliance with requirements - Landing gear components	358
20					Slow rotation (i.e., low pitch rate)	371
					Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence	37.1
21					integrity monitoring	401
-					Lack of adherence to SOP for take-off procedure in terms of speed bug checklist	+
22					preparation and verification.	419
\neg						П
					Inadequate certification process and / or flaws in methodology concerning verification	1
23					of the system / product compliance with requirements - FCS system or components	420
24					Flaws in manufacturer quality control process - FCS system components	421
\neg						П
25					Flaws in aircraft system maintenance process definition - FCS systems or components	422
26					Flaws in aircraft system maintenance process definition - Landing gear components.	377
27					Flaws in manufacturer quality control process - Landing gear components.	376



		Base events	Code	Definition	identifiable precursors	No.
ES	_	Base events	Code	Definition	identifiable precursors	No.
١,		Aircraft are positioned on collision course			Aircraft are positioned on collision course	
Ť		course		Unmodified flight plan requests would lead to separation	Arterare are positioned on comision course	
1	1	Strategic conflict	ER31F53	infringement	Flaws in Airspace and Air Traffic planning procedures design process	323
				Failure of air traffic flow and capacity management (ATFCM) to		
2	2	Ineffective ATFCM	ER31B10	prevent strategic conflict developing into pre-tactical conflict	Flaws in Airspace and Air Traffic planning procedures design process Inadequate coordination between ATM centers and/or ATC sectors	323
+					Flaws in conflict and separation minima infringement detection / elimination	32.
					procedures	326
				No attempts are made to identify pre-tactical conflicts before they	Flaws in conflict and separation minima infringement detection / elimination	
3	3	No ATC planning	ER31B91	reach the Tactical Controller	procedures	326
+					Tactical or / and Planning Controller tiredness - Inadequate workload distribution Flaws in Tactical or / and Planning Controller requirements definition process and/or	300
					training methodology	301
T				The radar picture is inadequate to allow the Planning Controller to	, , , , , , , , , , , , , , , , , , ,	
				identify the pre-tactical conflict, e.g. incomplete traffic picture,		
4	4	Inadequate strategic surveillance	ER31B9211	picture with overlapping labels, or too much traffic for the display	Flaure in Airchass and Air Traffic planning presendures design present	32
4	4	picture	EK31B9211	system Flight plan data is inadequate to allow the Planning Controller to	Flaws in Airspace and Air Traffic planning procedures design process	32
				identify the pre-tactical conflict, e.g. incorrect flight plan, flight plan		
				insufficient to identify conflicts, flight plan strips obtained too late,		
5	5	Inadequate flight plan data	ER31B9212	or aircraft not following flight plan.	Inadequate coordination between ATM centers and/or ATC sectors	32
					Lack of adherence of airlines to time contraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data.	32
+					Flaws in Airspace and Air Traffic planning procedures design process	32
+				Planning Controller obtain correct flight information but fails to	in this mir mapped and run in turne planning procedures design process	52.
		Planning controller failure to recognise		recognise medium-term conflict. This includes failure of MTCD if		1
6	6	conflict	ER31B922	present	Tactical or / and Planning Controller tiredness - Inadequate workload distribution	30
					Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology	20
+					training methodology Inadequate certification process and / or flaws in methodology concerning verification	30:
					of the system / product compliance with requirements - MTCD System	32
\top		Planning controller misjudgement of		Planning Controller aware of the conflict but misjudges the traffic		
7	7	conflict prevention	ER31B923	situation and results in an inadequate separation plan	Tactical or / and Planning Controller tiredness - Inadequate workload distribution	300
					Flaws in Tactical or / and Planning Controller requirements definition process and/or	
+		Inadequate planning controller		Planning Controller fails to coordinate with other sectors, resulting	training methodology	30:
8		coordination	ER31B93	in failure to implement planned traffic synchronisation	Tactical or / and Planning Controller tiredness - Inadequate workload distribution	30
				, , , , , , , , , , , , , , , , , , , ,	Flaws in Tactical or / and Planning Controller requirements definition process and/or	
\perp					training methodology	30:
_					Inadequate coordination between ATM centers and/or ATC sectors	32:
+		Planning controller failure to alert			Flaws in Airspace and Air Traffic planning procedures design process	323
9		tactical controller to conflict	ER31B94	Planning Controller fails to inform Tactical Controller of a conflict	Tactical or / and Planning Controller tiredness - Inadequate workload distribution	300
Ť					Flaws in Tactical or / and Planning Controller requirements definition process and/or	
					training methodology	301
4					Inadequate coordination between ATM centers and/or ATC sectors	321
				The radar picture is inadequate to allow the Tactical Controller to maintain separation in a plannable conflict, e.g. incomplete traffic		
10	10	Inadequate tactical surveillance picture	FR31B5111	picture or picture with overlapping labels	Flaws in Airspace and Air Traffic planning procedures design process	323
-				Process Process	Lack of adherence of airlines to time contraints and deadlines in terms of providing	
					the Network Manager Operation Centre with obligatory data.	327
Т				Flight plan data is inadequate to allow the Tactical Controller to		
				maintain separation in a plannable conflict, e.g. incorrect flight plan, flight plan insufficient to identify conflicts, flight plan strips		
11	11	Inadequate flight plan data	ER31B5112	obtained too late, or aircraft not following flight plan.	Tactical or / and Planning Controller tiredness - Inadequate workload distribution	300
		madequate ingrit plan data	ENGIDOTIE	obtained too late, or an erar not rollowing hight plans	Flaws in Tactical or / and Planning Controller requirements definition process and/or	50.
					training methodology	30:
\perp					Failure to identify the pre-tactical conflict before it reach the tactical controller	330
+					Lack of adherence of airlines to declared Flight Plan. Lack of adherence of airlines to time contraints and deadlines in terms of providing	329
					Lack of adherence of airlines to time contraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data.	327
\top				Tactical Controller obtains adequate flight information but fails to	a construction and an action of the construction 1	
12	12	ATCO failure to recognise conflict	ER31B512	recognise the conflict	Tactical or / and Planning Controller tiredness - Inadequate workload distribution	30
Г					Flaws in Tactical or / and Planning Controller requirements definition process and/or	L
+				Tactical Controller recognises the conflict, but misjudges the traffic	training methodology	30:
		ATCO misjudgement in tactical		situation and hence makes incorrect clearances or separation		
13		separation	ER31B513	instructions to the aircraft	Tactical or / and Planning Controller tiredness - Inadequate workload distribution	300
\top		·			Flaws in Tactical or / and Planning Controller requirements definition process and/or	
4					training methodology	30:
+				Tactical Controller fails to secondinate with -+h	Lack of adherence to SOP for Airborne operation in terms of minimum seprataion	331
14	1/1	Inadequate ATCO co-ordination	ER31B514	Tactical Controller fails to coordinate with other controllers, resulting in incorrect clearances or separation instructions	Tactical or / and Planning Controller tiredness - Inadequate workload distribution	300
+	14				Flaws in Tactical or / and Planning Controller requirements definition process and/or	500
\perp					training methodology	30:
T					Inadequate coordination between ATM centers and/or ATC sectors	323
		Inadequate ATCO transmission of	ED24DE24	Inadequate transmission of instruction from ATCO, e.g. incorrect	Last of Fadish and fairness	
15	15	instructions	ER31B521	clearance, late clearance and unclear phraseology	Lack of English proficiency Incorrect or confusing / misleading ATC instructions	132
+					Use of non-standard phraseology by pilot and/or controller	13
╧					Traffic controller tiredness - Inadequate workload distribution	13
					Flaws in traffic controller requirements definition process and/or training	
\bot					methodology	14
+					Lack of or poor communication quality	14
					Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	14
+				Communication between ATCO and pilot is lost due to technical		<u> </u>
16	16	Loss of communication	ER31B522	failure or human error	Prolonged loss of communication (PLOC) between pilot and controller	73
- 1 "			I	1	Traffic controller tiredness - Inadequate workload distribution	137



		Base events	Code	Definition	identifiable precursors	No.
					Flaws in traffic controller requirements definition process and/or training	
Ш					methodology	145
					Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	148
Н					Pilot tiredness - Inadequate workload distribution	167
					Flaws in pilot requirements definition process and/or training methodology	168
П					Unintuitive and / or error prone system manual - communication equipment.	305
Н				Failure of adequate readback from pilot and failure of ATCO to	Incorrect use of communication equipment	336
17	17	Inadequate pilot readback	ER31B523	challenge the failure	Lack of English proficiency	132
H				3.1.1.1.1.1	Incorrect or confusing / misleading ATC instructions	133
					Use of non-standard phraseology by pilot and/or controller	134
Н					Traffic controller tiredness - Inadequate workload distribution	137
					Flaws in traffic controller requirements definition process and/or training methodology	145
H					Lack of or poor communication quality	146
П					Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	
Н					driver	148
					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
H					Pilot tiredness - Inadequate workload distribution	167
					Flaws in pilot requirements definition process and/or training methodology	168
Н					Hearback ommitted	169
18	18	Inadequate pilot response to ATC	ER31B53	Flight crew fail to follow the clearances or separation instructions	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
13	10		211,020,0		Pilot tiredness - Inadequate workload distribution	167
口					Flaws in pilot requirements definition process and/or training methodology	168
Ц					Lack of adherence to Rules of the Air - adherence to Controller clearance	296
19	10	Conflict due to military traffic	ER31F6111	Unauthorised penetration of controlled airspace by military traffic	Failure to comply with an altitude or speed restriction / constraint Military activity in controlled airport or located within controlled area	315 339
19	19	Committ due to military traffit	CU2110111	Unauthorised penetration of controlled airspace by Military traffic Unauthorised penetration of controlled airspace by VFR (Visual	interior y activity in controlled airport of located within controlled area	229
20	20	Conflict due to VFR traffic	ER31F6112	Flight Rule) traffic	General aviation activity in controlled airport or located within controlled area	340
П		Inadequate ATCO transmission of		Inadequate transmission of instruction from ATCO that leads to a		
21	21	instructions	ER31F61211	vertical deviation of the aircraft	Lack of English proficiency Incorrect or confusing / misleading ATC instructions	132 133
Н					Use of non-standard phraseology by pilot and/or controller	133
H					Traffic controller tiredness - Inadequate workload distribution	137
H					Flaws in traffic controller requirements definition process and/or training	
Ц					methodology	145
					Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	140
Н					ariver	148
				Failure of adequate readback from pilot and failure of ATCO to		
22	22	Inadequate pilot readback	ER31F61212	challenge the failure that leads to a vertical deviation of the aircraft		132
Н					Incorrect or confusing / misleading ATC instructions	133 134
Н					Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution	134
H					Flaws in traffic controller requirements definition process and/or training	
Ц					methodology	145
Н					Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	146
					driver	148
H					Pilot tiredness - Inadequate workload distribution	167
П					Flaws in pilot requirements definition process and/or training methodology	168
Н				Marking deviation of alternative to all the condition. This plan is also de-	Hearback ommitted	169
				Vertical deviation of aircraft due to pilot handling. This also includes cases of correct readback followed by incorrect action, failures to	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	
23	23	Dilat handling arror				
		Pilot handling error	ER31F6122	follow SID or climb/ descent without clearance.	or / and passive contribution to the PF duties	151
Ш		Prior nandling error	ER31F6122	follow SID or climb/ descent without clearance.	Pilot tiredness - Inadequate workload distribution	167
		Prior nanuling error	ER31F6122	follow SID or climb/ descent without clearance.	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168
\vdash		Prior nanuming error	ER31F6122	follow SID or climb/ descent without clearance.	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to Rules of the Air - adherence to Controller clearance	167
24	24		ER31F6122 ER31F6123		Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to Rules of the Air - adherence to Controller clearance Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	167 168 296
24	24	Altimeter setting error		follow SID or climb/ descent without clearance. Vertical deviation of aircraft due to inadequate altimeter settings	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to Rules of the Air - adherence to Controller clearance Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution	167 168 296 151 167
24	24				Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to Rules of the Air - adherence to Controller clearance Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168 296 151 167 168
24	24				Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to Rules of the Air - adherence to Controller clearance Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Altimeter setting error	167 168 296 151 167 168 274
24	24			Vertical deviation of aircraft due to inadequate altimeter settings	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to Rules of the Air - adherence to Controller clearance Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Altimeter setting error Lack of adherence to SOP for take-off procedure in terms of altimeter callibration.	167 168 296 151 167 168
24		Altimeter setting error			Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to Rules of the Air - adherence to Controller clearance Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Altimeter setting error Lack of adherence to SOP for take-off procedure in terms of altimeter callibration. System failure affecting the operation of primary instruments / displays or standby instruments	167 168 296 151 167 168 274
24		Altimeter setting error Technical failure in autopilot or nav	ER31F6123	Vertical deviation of aircraft due to inadequate altimeter settings Vertical deviation of aircraft due to technical failure in autopilot or	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to Rules of the Air - adherence to Controller clearance Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Altimeter setting error Lack of adherence to SOP for take-off procedure in terms of altimeter callibration. System failure affecting the operation of primary instruments / displays or standby instruments Flaws in maintenance technician / airworthiness specialist requirements definition	167 168 296 151 167 168 274 294
24		Altimeter setting error Technical failure in autopilot or nav	ER31F6123	Vertical deviation of aircraft due to inadequate altimeter settings Vertical deviation of aircraft due to technical failure in autopilot or	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to Rules of the Air - adherence to Controller clearance Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Altimeter setting error Lack of adherence to SOP for take-off procedure in terms of altimeter callibration. System failure affecting the operation of primary instruments / displays or standby instruments Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	167 168 296 151 167 168 274 294
25		Altimeter setting error Technical failure in autopilot or nav	ER31F6123	Vertical deviation of aircraft due to inadequate altimeter settings Vertical deviation of aircraft due to technical failure in autopilot or	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to Rules of the Air - adherence to Controller clearance Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Altimeter setting error Lack of adherence to SOP for take-off procedure in terms of altimeter callibration. System failure affecting the operation of primary instruments / displays or standby instruments Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	167 168 296 151 167 168 274 294 26
25		Altimeter setting error Technical failure in autopilot or nav	ER31F6123	Vertical deviation of aircraft due to inadequate altimeter settings Vertical deviation of aircraft due to technical failure in autopilot or	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to Rules of the Air - adherence to Controller clearance Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Altimeter setting error Lack of adherence to SOP for take-off procedure in terms of altimeter callibration. System failure affecting the operation of primary instruments / displays or standby instruments Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	167 168 296 151 167 168 274 294 26 149
24		Altimeter setting error Technical failure in autopilot or nav	ER31F6123	Vertical deviation of aircraft due to inadequate altimeter settings Vertical deviation of aircraft due to technical failure in autopilot or	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to Rules of the Air - adherence to Controller clearance Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Altimeter setting error Lack of adherence to SOP for take-off procedure in terms of altimeter callibration. System failure affecting the operation of primary instruments / displays or standby instruments Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and	167 168 296 151 167 168 274 294 26 149
24		Altimeter setting error Technical failure in autopilot or nav	ER31F6123	Vertical deviation of aircraft due to inadequate altimeter settings Vertical deviation of aircraft due to technical failure in autopilot or	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to Rules of the Air - adherence to Controller clearance Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Altimeter setting error Lack of adherence to SOP for take-off procedure in terms of altimeter callibration. System failure affecting the operation of primary instruments / displays or standby instruments Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	167 168 296 151 167 168 274 294 26 149
24		Altimeter setting error Technical failure in autopilot or nav	ER31F6123	Vertical deviation of aircraft due to inadequate altimeter settings Vertical deviation of aircraft due to technical failure in autopilot or	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to Rules of the Air - adherence to Controller clearance Lack of adherence to Rules of the Air - adherence to Controller clearance Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Altimeter setting error Lack of adherence to SOP for take-off procedure in terms of altimeter callibration. System failure affecting the operation of primary instruments / displays or standby instruments Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) Flaws in manufacturer quality control process - FMS subsystem and components	167 168 296 151 167 168 274 294 26 149
24		Altimeter setting error Technical failure in autopilot or nav	ER31F6123	Vertical deviation of aircraft due to inadequate altimeter settings Vertical deviation of aircraft due to technical failure in autopilot or	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to Rules of the Air - adherence to Controller clearance Lack of adherence to Rules of the Air - adherence to Controller clearance Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Altimeter setting error Lack of adherence to SOP for take-off procedure in terms of altimeter callibration. System failure affecting the operation of primary instruments / displays or standby instruments Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)	167 168 296 151 167 168 274 294 26 149
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24		Altimeter setting error Technical failure in autopilot or nav	ER31F6123	Vertical deviation of aircraft due to inadequate altimeter settings Vertical deviation of aircraft due to technical failure in autopilot or	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to Rules of the Air - adherence to Controller clearance Lack of adherence to Rules of the Air - adherence to Controller clearance Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Altimeter setting error Lack of adherence to SOP for take-off procedure in terms of altimeter callibration. System failure affecting the operation of primary instruments / displays or standby instruments Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) Flaws in maintenance process definition - FMS subsystems and components (autopilot incl.) Flaws in aircraft system maintenance process definition - Onboard navigational	167 168 296 151 167 168 274 294 26 149 150 299 306 410
24		Altimeter setting error Technical failure in autopilot or nav	ER31F6123	Vertical deviation of aircraft due to inadequate altimeter settings Vertical deviation of aircraft due to technical failure in autopilot or	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to Rules of the Air - adherence to Controller clearance Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Altimeter setting error Lack of adherence to SOP for take-off procedure in terms of altimeter callibration. System failure affecting the operation of primary instruments / displays or standby instruments Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.) Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	167 168 296 151 167 168 274 294 26 149 150 299 306 410
24		Altimeter setting error Technical failure in autopilot or nav	ER31F6123	Vertical deviation of aircraft due to inadequate altimeter settings Vertical deviation of aircraft due to technical failure in autopilot or	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to Rules of the Air - adherence to Controller clearance Lack of adherence to Rules of the Air - adherence to Controller clearance Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Altimeter setting error Lack of adherence to SOP for take-off procedure in terms of altimeter callibration. System failure affecting the operation of primary instruments / displays or standby instruments Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.) Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.) Flaws in aircraft system maintenance process definition - Onboard navigational systems and components Inadequate certification process and / or flaws in methodology concerning verification	167 168 296 151 167 168 274 294 26 149 150 299 306 410
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ш					Level bust (pilot lapse or late re-clearance by ATC)	313
Н					Deviation from flight trajectory commanded by controller	343
27	27	Weather induced level bust	ER31F6126	Vertical deviation resulting from weather conditions	Convective weather encounter	18
	20		500405	Given a level bust occurs, the aircraft has separation infringement		
28	28	Level bust results in conflict	ER31C6	with another aircraft	Convective weather encounter in traffic intensive airport proximity	76
				The radar picture is inadequate to allow the Tactical Controller to		
		Inadequate tactical surveillance		maintain separation in an unplannable conflict, e.g. missing or		
29	29	picture	ER31B611	unidentified targets	Airspace infringement	71
					System failure affecting the operation of primary instruments / displays or standby	
\vdash					instruments - ADS-B System	78
		ATCO failure to recognise conflict in	50040540	ATCO fails to recognise the unplannable conflict in time to issue		
30	30	time	ER31B612	separation instructions	Airspace infringement	71
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					Flaws in traffic controller requirements definition process and/or training	445
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\vdash					Altitude deviation	312
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31	31	instructions	ER31B621	from ATCO results in failure to maintain separation	Lack of English proficiency	132
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ΙŢ			I	Communication between ATCO and pilot is lost during an		l
32	32	Loss of communication	ER31B622	unplannable conflict due to technical failure or human error	Prolonged loss of communication (PLOC) between pilot and controller	73
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33				conflict and failure of ATCO to challenge the failure	Lack of English proficiency	400
\vdash	33	Inadequate pilot readback	ER31B623			132
	33	Inadequate pilot readback	EN318023		Incorrect or confusing / misleading ATC instructions	133
ш	33	Inadequate pilot readback	EN31B023		Use of non-standard phraseology by pilot and/or controller	133 134
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		Base events	Code	Definition	identifiable precursors	No.
П		buse events		Demicion	Failure to comply with an altitude or speed restriction / constraint	315
П					Navigation deviation	317
					Inadequate coordination between ATM centers and/or ATC sectors	321
Ш					Flaws in Airspace and Air Traffic planning procedures design process	323
					Flaws in conflict and separation minima infringement detection / elimination	
Н					procedures Lack of adherence of airlines to time contraints and deadlines in terms of providing	326
					the Network Manager Operation Centre with obligatory data.	327
\dashv					Inadequate certification process and / or flaws in methodology concerning verification	_
					of the system / product compliance with requirements - MTCD System	328
					Lack of adherence of airlines to declared Flight Plan.	329
					Failure to identify the pre-tactical conflict before it reach the tactical controller	330
					Lack of adherence to SOP for Airborne operation in terms of minimum seprataion	331
					Incorrect use of communication equipment	336
					Military activity in controlled airport or located within controlled area	339
_					General aviation activity in controlled airport or located within controlled area	340
\dashv					Intensified traffic related to general aviation activity e. g. over GA airport / airfield	342 343
\dashv					Deviation from flight trajectory commanded by controller Flaws in aircraft system maintenance process definition - FMS subsystems and	343
					components (autopilot incl.)	410
\dashv					Flaws in aircraft system maintenance process definition - Onboard navigational	+ 120
					systems and components	491
_					Flaws in manufacturer quality control process - Fire extinguishing system components	482
					Flaws in manufacturer quality control process - Onboard navigational systems and	
_					components.	493
,		CTCA fella ta aliua un constituti di	ED24 D22	Failure of CTCA to plant ATCO to a 100	Inadequate certification process and / or flaws in methodology concerning verification	
45	45	STCA fails to give warning in time	ER31B32	Failure of STCA to alert ATCO to a conflict	of the system / product compliance with requirements - STCA System System failure affecting the operation of primary instruments / displays or standby	351
			1		instruments / displays or standay	26
\dashv			 		Airspace infringement	71
\dashv					Other cases of loss of separation	72
╛					Prolonged loss of communication (PLOC) between pilot and controller	73
J					Convective weather encounter in traffic intensive airport proximity	76
					System failure affecting the operation of primary instruments / displays or standby	
_					instruments - ADS-B System	78
_					Lack of English proficiency	132
\dashv					Incorrect or confusing / misleading ATC instructions	133
\dashv					Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution	134 137
\dashv					Flaws in traffic controller requirements definition process and/or training	137
					methodology	145
					Lack of or poor communication quality	146
					Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	
					driver	148
					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	
					or / and passive contribution to the PF duties	151
					Pilot tiredness - Inadequate workload distribution	167
\dashv					Flaws in pilot requirements definition process and/or training methodology	168
\dashv					Hearback ommitted Flaws in aircraft system maintenance process definition - Communication equipment	169
					systems and components.	270
\dashv					Inadequate certification process and / or flaws in methodology concerning verification	
					of the system / product compliance with requirements - Communication equipment	
					systems and components.	271
					Flaws in manufacturer quality control process - Communication equipment systems	
_					and components.	272
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4			1		Lack of adherence to SOP for take-off procedure in terms of altimeter callibration. Lack of adherence to Rules of the Air - adherence to Controller clearance	294 296
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					of the system / product compliance with requirements - FMS subsystems and	Τ
			1		components (autopilot incl.)	299
			İ		Tactical or / and Planning Controller tiredness - Inadequate workload distribution	300
\neg					Flaws in Tactical or / and Planning Controller requirements definition process and/or	
					training methodology	301
\Box					Unintuitive and / or error prone system manual - communication equipment.	305
			Ι		Flaws in manufacturer quality control process - FMS subsystem and components	L
4					(autopilot incl.)	306
-			 		Altitude deviation Level bust (pilot lapse or late re-clearance by ATC)	312 313
-			 		Failure to comply with an altitude or speed restriction / constraint	313
\dashv			 		Navigation deviation	317
\dashv					Inadequate coordination between ATM centers and/or ATC sectors	321
\dashv					Flaws in Airspace and Air Traffic planning procedures design process	323
\neg					Flaws in conflict and separation minima infringement detection / elimination	Т
Ц					procedures	326
I			_		Lack of adherence of airlines to time contraints and deadlines in terms of providing	1 -
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					Inadequate certification process and / or flaws in methodology concerning verification	
-			 		of the system / product compliance with requirements - MTCD System	328
-			 		Lack of adherence of airlines to declared Flight Plan. Failure to identify the pre-tactical conflict before it reach the tactical controller	329 330
\dashv			 		Lack of adherence to SOP for Airborne operation in terms of minimum seprataion	331
\dashv			<u> </u>		Incorrect use of communication equipment	336
\dashv					Military activity in controlled airport or located within controlled area	339
\dashv					General aviation activity in controlled airport or located within controlled area	340
コ					Intensified traffic related to general aviation activity e. g. over GA airport / airfield	342
					Deviation from flight trajectory commanded by controller	343
					Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)	410



	Base events	Code	Definition	identifiable precursors
				Flaws in aircraft system maintenance process definition - Onboard navigational
				systems and components
				Flaves in manufacturer quality control process. Fire outling visiting system companyons
				Flaws in manufacturer quality control process - Fire extinguishing system components Flaws in manufacturer quality control process - Onboard navigational systems and
				components.
4	6 ATCO fails to respond to STCA warning	ER31B33	Failure of ATCO to respond to the STCA warning	Traffic controller tiredness - Inadequate workload distribution
				Flaws in traffic controller requirements definition process and/or training
				methodology
				System failure affecting the operation of primary instruments / displays or standby
				instruments
	+			Airspace infringement
	+			Other cases of loss of separation
	+	+		Prolonged loss of communication (PLOC) between pilot and controller Convective weather encounter in traffic intensive airport proximity
	+			System failure affecting the operation of primary instruments / displays or standby
				instruments - ADS-B System
				Lack of English proficiency
				Incorrect or confusing / misleading ATC instructions
				Use of non-standard phraseology by pilot and/or controller
				Traffic controller tiredness - Inadequate workload distribution
				Flaws in traffic controller requirements definition process and/or training
				methodology
				Lack of or poor communication quality
		1		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle
	+	1		driver
				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring
	+	+		or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution
	+	+		Flaws in pilot requirements definition process and/or training methodology
	+	+	+	Hearback ommitted
	1			Flaws in aircraft system maintenance process definition - Communication equipment
				systems and components.
				Inadequate certification process and / or flaws in methodology concerning verification
	1	1		of the system / product compliance with requirements - Communication equipment
				systems and components.
				Flaws in manufacturer quality control process - Communication equipment systems
				and components.
				Altimeter setting error
				Lack of adherence to SOP for take-off procedure in terms of altimeter callibration.
				Lack of adherence to Rules of the Air - adherence to Controller clearance
				Inadequate certification process and / or flaws in methodology concerning verification
				of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)
	+	+		Tactical or / and Planning Controller tiredness - Inadequate workload distribution
	+			Flaws in Tactical or / and Planning Controller requirements definition process and/or
				training methodology
				Unintuitive and / or error prone system manual - communication equipment.
	1			Flaws in manufacturer quality control process - FMS subsystem and components
				(autopilot incl.)
				Altitude deviation
				Level bust (pilot lapse or late re-clearance by ATC)
				Failure to comply with an altitude or speed restriction / constraint
				Navigation deviation
				Inadequate coordination between ATM centers and/or ATC sectors
				Flaws in Airspace and Air Traffic planning procedures design process
				Flaws in conflict and separation minima infringement detection / elimination procedures
	+	+		Lack of adherence of airlines to time contraints and deadlines in terms of providing
				the Network Manager Operation Centre with obligatory data.
	+	+		Inadequate certification process and / or flaws in methodology concerning verification
				of the system / product compliance with requirements - MTCD System
	1			Lack of adherence of airlines to declared Flight Plan.
				Failure to identify the pre-tactical conflict before it reach the tactical controller
				Lack of adherence to SOP for Airborne operation in terms of minimum seprataion
				Incorrect use of communication equipment
				Military activity in controlled airport or located within controlled area
	1	1		General aviation activity in controlled airport or located within controlled area
	+	1		Intensified traffic related to general aviation activity e. g. over GA airport / airfield
	+	+	+	Deviation from flight trajectory commanded by controller
		1		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)
	+	+		Flaws in aircraft system maintenance process definition - Onboard navigational
				systems and components
				A CONTRACTOR
		1		Flaws in manufacturer quality control process - Fire extinguishing system components
				Flaws in manufacturer quality control process - Onboard navigational systems and
				components.
	ATCO fails to recover separation in		ATCO responds to an STCA warning but fails to make effective	
4	time	ER31B34	resolving action in time	Traffic controller tiredness - Inadequate workload distribution
		1		Flaws in traffic controller requirements definition process and/or training
	+	1		methodology
		1		System failure affecting the operation of primary instruments / displays or standby
	+	-	+	instruments Aircrass infringement
	+	+	+	Airspace infringement
	+	+	+	Other cases of loss of separation Prolonged loss of communication (PLOC) between pilot and controller
	+	+	+	Convective weather encounter in traffic intensive airport proximity
	T. Control of the Con			
		1		System failure affecting the operation of primary instruments / displays or standby
				System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System
				System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System Lack of English proficiency



		_		- 6 to		
ш		Base events	Code	Definition	identifiable precursors	No. 134
					Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution	134
Н					Flaws in traffic controller requirements definition process and/or training	137
					methodology	145
					Lack of or poor communication quality	146
\Box					Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	_
					driver	148
					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	
					or / and passive contribution to the PF duties	151
					Pilot tiredness - Inadequate workload distribution	167
					Flaws in pilot requirements definition process and/or training methodology	168
					Hearback ommitted	169
					Flaws in aircraft system maintenance process definition - Communication equipment	
					systems and components.	270
					Inadequate certification process and / or flaws in methodology concerning verification	1
					of the system / product compliance with requirements - Communication equipment	274
_					systems and components.	271
					Flaws in manufacturer quality control process - Communication equipment systems	
\dashv					and components.	272
\dashv					Altimeter setting error Lack of adherence to SOP for take-off procedure in terms of altimeter callibration.	294
\dashv					Lack of adherence to SOP for take-on procedure in terms of artificet calibration. Lack of adherence to Rules of the Air - adherence to Controller clearance	294
\dashv					Inadequate certification process and / or flaws in methodology concerning verification	-
					of the system / product compliance with requirements - FMS subsystems and	Ί
					components (autopilot incl.)	299
\dashv					Tactical or / and Planning Controller tiredness - Inadequate workload distribution	300
\dashv					Flaws in Tactical or / and Planning Controller requirements definition process and/or	1
					training methodology	301
\dashv			İ		Unintuitive and / or error prone system manual - communication equipment.	305
\dashv					Flaws in manufacturer quality control process - FMS subsystem and components	1
					(autopilot incl.)	306
一					Altitude deviation	312
					Level bust (pilot lapse or late re-clearance by ATC)	313
╗					Failure to comply with an altitude or speed restriction / constraint	315
					Navigation deviation	317
					Inadequate coordination between ATM centers and/or ATC sectors	321
					Flaws in Airspace and Air Traffic planning procedures design process	323
					Flaws in conflict and separation minima infringement detection / elimination	
					procedures	326
					Lack of adherence of airlines to time contraints and deadlines in terms of providing	
					the Network Manager Operation Centre with obligatory data.	327
					Inadequate certification process and / or flaws in methodology concerning verification	
					of the system / product compliance with requirements - MTCD System	328
					Lack of adherence of airlines to declared Flight Plan.	329
_					Failure to identify the pre-tactical conflict before it reach the tactical controller	330
_					Lack of adherence to SOP for Airborne operation in terms of minimum seprataion	331
-					Incorrect use of communication equipment	336
-					Military activity in controlled airport or located within controlled area	339
\dashv					General aviation activity in controlled airport or located within controlled area	340 342
\dashv					Intensified traffic related to general aviation activity e.g. over GA airport / airfield Deviation from flight trajectory commanded by controller	343
\dashv					Flaws in aircraft system maintenance process definition - FMS subsystems and	343
					components (autopilot incl.)	410
\dashv					Flaws in aircraft system maintenance process definition - Onboard navigational	1410
					systems and components	491
\dashv					systems and components	+31
					Flaws in manufacturer quality control process - Fire extinguishing system components	482
\dashv					Flaws in manufacturer quality control process - Onboard navigational systems and	
						402
\neg					components.	
					components.	493
48	48	No independent ATCO monitoring	ER31B41	No other ATCO is monitoring the aircraft's trajectory independently	components. Lack of adherence to regulations concerning independent ATCO monitoring	493
48	48	No independent ATCO monitoring	ER31B41	No other ATCO is monitoring the aircraft's trajectory independently		493
48	48	No independent ATCO monitoring	ER31B41	No other ATCO is monitoring the aircraft's trajectory independently	Lack of adherence to regulations concerning independent ATCO monitoring System failure affecting the operation of primary instruments / displays or standby	493 346
48	48	No independent ATCO monitoring	ER31B41	No other ATCO is monitoring the aircraft's trajectory independently	Lack of adherence to regulations concerning independent ATCO monitoring	
48	48	No independent ATCO monitoring	ER31B41	No other ATCO is monitoring the aircraft's trajectory independently	Lack of adherence to regulations concerning independent ATCO monitoring System failure affecting the operation of primary instruments / displays or standby instruments	493 346 26 71
48	48	No independent ATCO monitoring	ER31B41	No other ATCO is monitoring the aircraft's trajectory independently	Lack of adherence to regulations concerning independent ATCO monitoring System failure affecting the operation of primary instruments / displays or standby instruments Airspace infringement	493 346 26 71 72
48	48	No independent ATCO monitoring	ER31B41	No other ATCO is monitoring the aircraft's trajectory independently	Lack of adherence to regulations concerning independent ATCO monitoring System failure affecting the operation of primary instruments / displays or standby instruments Airspace infringement Other cases of loss of separation Prolonged loss of communication (PLOC) between pilot and controller Convective weather encounter in traffic intensive airport proximity	493 346 26 71 72 73
48	48	No independent ATCO monitoring	ER31B41	No other ATCO is monitoring the aircraft's trajectory independently	Lack of adherence to regulations concerning independent ATCO monitoring System failure affecting the operation of primary instruments / displays or standby Instruments Airspace infringement Other cases of loss of separation Prolonged loss of communication (PLOC) between pilot and controller	493 346 26 71 72 73
48	48	No independent ATCO monitoring	ER31B41	No other ATCO is monitoring the aircraft's trajectory independently	Lack of adherence to regulations concerning independent ATCO monitoring System failure affecting the operation of primary instruments / displays or standby instruments Airspace infringement Other cases of loss of separation Prolonged loss of communication (PLOC) between pilot and controller Convective weather encounter in traffic intensive airport proximity System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System	493 346 26 71 72 73 76
48	48	No independent ATCO monitoring	ER31B41	No other ATCO is monitoring the aircraft's trajectory independently	Lack of adherence to regulations concerning independent ATCO monitoring System failure affecting the operation of primary instruments / displays or standby Instruments Airspace infringement Other cases of loss of separation Prolonged loss of communication (PLOC) between pilot and controller Convective weather encounter in traffic intensive airport proximity System failure affecting the operation of primary instruments / displays or standby Instruments - ADS-B System Lack of English proficiency	493 346 26 71 72 73 76 78 132
48	48	No independent ATCO monitoring	ER31B41	No other ATCO is monitoring the aircraft's trajectory independently	Lack of adherence to regulations concerning independent ATCO monitoring System failure affecting the operation of primary instruments / displays or standby instruments Airspace infringement Other cases of loss of separation Prolonged loss of communication (PLOC) between pilot and controller Convective weather encounter in traffic intensive airport proximity System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System Lack of English proficiency Incorrect or confusing / misleading ATC instructions	493 346 26 71 72 73 76 78 132 133
48	48	No independent ATCO monitoring	ER31B41	No other ATCO is monitoring the aircraft's trajectory independently	Lack of adherence to regulations concerning independent ATCO monitoring System failure affecting the operation of primary instruments / displays or standby instruments Airspace infringement Other cases of loss of separation Prolonged loss of communication (PLOC) between pilot and controller Convective weather encounter in traffic intensive airport proximity System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller	493 346 26 71 72 73 76 78 132 133 134
48	48	No independent ATCO monitoring	ER31841	No other ATCO is monitoring the aircraft's trajectory independently	Lack of adherence to regulations concerning independent ATCO monitoring System failure affecting the operation of primary instruments / displays or standby Instruments Airspace infringement Other cases of loss of separation Prolonged loss of communication (PLOC) between pilot and controller Convective weather encounter in traffic intensive airport proximity System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution	493 346 26 71 72 73 76 78 132 133 134
48	48	No independent ATCO monitoring	ER31B41	No other ATCO is monitoring the aircraft's trajectory independently	Lack of adherence to regulations concerning independent ATCO monitoring System failure affecting the operation of primary instruments / displays or standby instruments Airspace infringement Other cases of loss of separation Prolonged loss of communication (PLOC) between pilot and controller Convective weather encounter in traffic intensive airport proximity System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training	493 346 71 72 73 76 78 132 133 134 137
48	48	No independent ATCO monitoring	ER31B41	No other ATCO is monitoring the aircraft's trajectory independently	Lack of adherence to regulations concerning independent ATCO monitoring System failure affecting the operation of primary instruments / displays or standby instruments Airspace infringement Other cases of loss of separation Prolonged loss of communication (PLOC) between pilot and controller Convective weather encounter in traffic intensive airport proximity System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology	493 346 71 72 73 76 78 132 133 134 137
48	48	No independent ATCO monitoring	ER31841	No other ATCO is monitoring the aircraft's trajectory independently	Lack of adherence to regulations concerning independent ATCO monitoring System failure affecting the operation of primary instruments / displays or standby instruments Airspace infringement Other cases of loss of separation Prolonged loss of communication (PLOC) between pilot and controller Convective weather encounter in traffic intensive airport proximity System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality	493 346 26 71 72 73 76 78 132 133 134 137 145
48	48	No independent ATCO monitoring	ER31B41	No other ATCO is monitoring the aircraft's trajectory independently	Lack of adherence to regulations concerning independent ATCO monitoring System failure affecting the operation of primary instruments / displays or standby Instruments Airspace infringement Other cases of loss of separation Prolonged loss of communication (PLOC) between pilot and controller Convective weather encounter in traffic intensive airport proximity System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	493 346 71 72 73 76 78 132 133 134 137 145
48	48	No independent ATCO monitoring	ER31B41	No other ATCO is monitoring the aircraft's trajectory independently	Lack of adherence to regulations concerning independent ATCO monitoring System failure affecting the operation of primary instruments / displays or standby instruments Airspace infringement Other cases of loss of separation Prolonged loss of communication (PLOC) between pilot and controller Convective weather encounter in traffic intensive airport proximity System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	493 346 26 71 72 73 76 78 132 133 134 137 145 146
48	48	No independent ATCO monitoring	ER31B41	No other ATCO is monitoring the aircraft's trajectory independently	Lack of adherence to regulations concerning independent ATCO monitoring System failure affecting the operation of primary instruments / displays or standby instruments Airspace infringement Other cases of loss of separation Prolonged loss of communication (PLOC) between pilot and controller Convective weather encounter in traffic intensive airport proximity System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	493 346 26 71 72 73 76 78 132 133 134 137 145 146
48	48	No independent ATCO monitoring	ER31841	No other ATCO is monitoring the aircraft's trajectory independently	Lack of adherence to regulations concerning independent ATCO monitoring System failure affecting the operation of primary instruments / displays or standby instruments Airspace infringement Other cases of loss of separation Prolonged loss of communication (PLOC) between pilot and controller Convective weather encounter in traffic intensive airport proximity System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	493 346 26 71 72 73 76 78 132 133 134 137 145 146
48	48	No independent ATCO monitoring	ER31B41	No other ATCO is monitoring the aircraft's trajectory independently	Lack of adherence to regulations concerning independent ATCO monitoring System failure affecting the operation of primary instruments / displays or standby instruments Airspace infringement Other cases of loss of separation Prolonged loss of communication (PLOC) between pilot and controller Convective weather encounter in traffic intensive airport proximity System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of ar poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	493 346 26 71 73 76 78 132 133 134 137 145 146 148 151 167
48	48	No independent ATCO monitoring	ER31841	No other ATCO is monitoring the aircraft's trajectory independently	Lack of adherence to regulations concerning independent ATCO monitoring System failure affecting the operation of primary instruments / displays or standby instruments Airspace infringement Other cases of loss of separation Prolonged loss of communication (PLOC) between pilot and controller Convective weather encounter in traffic intensive airport proximity System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	493 346 71 72 73 76 78 132 133 134 145 146 148 151 167 168
48	48	No independent ATCO monitoring	ER31841	No other ATCO is monitoring the aircraft's trajectory independently	Lack of adherence to regulations concerning independent ATCO monitoring System failure affecting the operation of primary instruments / displays or standby instruments Airspace infringement Other cases of loss of separation Prolonged loss of communication (PLOC) between pilot and controller Convective weather encounter in traffic intensive airport proximity System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Hearback ommitted	493 346 26 71 72 73 76 78 132 133 134 137 145 146 148 151 167 168
48	48	No independent ATCO monitoring	ER31B41	No other ATCO is monitoring the aircraft's trajectory independently	Lack of adherence to regulations concerning independent ATCO monitoring System failure affecting the operation of primary instruments / displays or standby instruments Airspace infringement Other cases of loss of separation Prolonged loss of communication (PLOC) between pilot and controller Convective weather encounter in traffic intensive airport proximity System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF distribution Flaws in aircraft system maintenance process and/or training methodology Hearback ommitted Flaws in aircraft system maintenance process definition - Communication equipment	493 346 266 711 72 73 76 78 132 133 134 137 145 1466 151 167 168 169
48	48	No independent ATCO monitoring	ER31B41	No other ATCO is monitoring the aircraft's trajectory independently	Lack of adherence to regulations concerning independent ATCO monitoring System failure affecting the operation of primary instruments / displays or standby instruments Airspace infringement Other cases of loss of separation Prolonged loss of communication (PLOC) between pilot and controller Convective weather encounter in traffic intensive airport proximity System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot triedness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Hearback ommitted Flaws in aircraft system maintenance process definition - Communication equipment systems and components.	493 346 71 72 73 76 78 132 133 134 137 145 146 148 169 270
48	48	No independent ATCO monitoring	ER31841	No other ATCO is monitoring the aircraft's trajectory independently	Lack of adherence to regulations concerning independent ATCO monitoring System failure affecting the operation of primary instruments / displays or standby instruments Airspace infringement Other cases of loss of separation Prolonged loss of communication (PLOC) between pilot and controller Convective weather encounter in traffic intensive airport proximity System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot triedness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Hearback ommitted Flaws in pilot requirements definition process definition - Communication equipment systems and components. Inadequate certification process and / or flaws in methodology concerning verification	493 346 71 72 73 76 78 132 133 134 137 145 146 148 169 270
48	48	No independent ATCO monitoring	ER31B41	No other ATCO is monitoring the aircraft's trajectory independently	Lack of adherence to regulations concerning independent ATCO monitoring System failure affecting the operation of primary instruments / displays or standby instruments Airspace infringement Other cases of loss of separation Prolonged loss of communication (PLOC) between pilot and controller Convective weather encounter in traffic intensive airport proximity System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System Salure affecting the operation of primary instruments / displays or standby instruments - ADS-B System Convective affecting the operation of primary instruments / displays or standby instruments - ADS-B System Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tredeness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Hearback communication equipment systems and components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment of the system / product compliance with requirements - Communication equipment	493 346 26 71 72 73 76 78 132 133 134 137 145 146 148 169 270
48	48	No independent ATCO monitoring	ER31B41	No other ATCO is monitoring the aircraft's trajectory independently	Lack of adherence to regulations concerning independent ATCO monitoring System failure affecting the operation of primary instruments / displays or standby instruments Airspace infringement Other cases of loss of separation Prolonged loss of communication (PLOC) between pilot and controller Convective weather encounter in traffic intensive airport proximity System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in increase - Inadequate workload distribution Flaws in increase - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Hearback ommitted Flaws in aircraft system maintenance process definition - Communication equipment systems and components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.	493 346 266 71 72 73 76 78 132 133 1344 137 145 146 168 169 270
48	48	No independent ATCO monitoring	ER31841	No other ATCO is monitoring the aircraft's trajectory independently	Lack of adherence to regulations concerning independent ATCO monitoring System failure affecting the operation of primary instruments / displays or standby instruments Airspace infringement Other cases of loss of separation Prolonged loss of communication (PLOC) between pilot and controller Convective weather encounter in traffic intensive airport proximity System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Hearback ommitted Flaws in pilot requirements definition process definition - Communication equipment systems and components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components. Flaws in manufacturer quality control process - Communication equipment systems	493 346 26 71 72 73 76 78 132 133 134 137 145 146 148 169 270
48	48	No independent ATCO monitoring	ER31B41	No other ATCO is monitoring the aircraft's trajectory independently	Lack of adherence to regulations concerning independent ATCO monitoring System failure affecting the operation of primary instruments / displays or standby instruments Airspace infringement Other cases of loss of separation Prolonged loss of communication (PLOC) between pilot and controller Convective weather encounter in traffic intensive airport proximity System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in increase - Inadequate workload distribution Flaws in increase - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Hearback ommitted Flaws in aircraft system maintenance process definition - Communication equipment systems and components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.	493 346 71 72 73 76 78 132 133 134 137 145 146 168 169 270



		Base events	Code	Definition	identifiable precursors	No.
		1			Lack of adherence to Rules of the Air - adherence to Controller clearance	296
					Inadequate certification process and / or flaws in methodology concerning verification	
					of the system / product compliance with requirements - FMS subsystems and	
-			-		components (autopilot incl.)	299 300
Н					Tactical or / and Planning Controller tiredness - Inadequate workload distribution Flaws in Tactical or / and Planning Controller requirements definition process and/or	300
					training methodology	30:
Н			+		Unintuitive and / or error prone system manual - communication equipment.	305
П					Flaws in manufacturer quality control process - FMS subsystem and components	
					(autopilot incl.)	306
					Altitude deviation	312
					Level bust (pilot lapse or late re-clearance by ATC)	313
					Failure to comply with an altitude or speed restriction / constraint	315
_					Navigation deviation	317
_					Inadequate coordination between ATM centers and/or ATC sectors	32:
4					Flaws in Airspace and Air Traffic planning procedures design process	323
					Flaws in conflict and separation minima infringement detection / elimination	326
\dashv		+	_		procedures Lack of adherence of airlines to time contraints and deadlines in terms of providing	320
					the Network Manager Operation Centre with obligatory data.	327
┪					Inadequate certification process and / or flaws in methodology concerning verification	-
					of the system / product compliance with requirements - MTCD System	328
П					Lack of adherence of airlines to declared Flight Plan.	329
╗					Failure to identify the pre-tactical conflict before it reach the tactical controller	330
╛					Lack of adherence to SOP for Airborne operation in terms of minimum seprataion	333
J					Incorrect use of communication equipment	336
╝					Military activity in controlled airport or located within controlled area	339
			1		General aviation activity in controlled airport or located within controlled area	340
4		1	-		Intensified traffic related to general aviation activity e. g. over GA airport / airfield	342
4		1	-		Deviation from flight trajectory commanded by controller	343
		1	1		Flaws in aircraft system maintenance process definition - FMS subsystems and	44.
4			+		components (autopilot incl.) Flaws in aircraft system maintenance process definition - Onboard navigational	410
		1	1		systems and components	49:
Н		1	+			73.
					Flaws in manufacturer quality control process - Fire extinguishing system components	482
┪		1			Flaws in manufacturer quality control process - Onboard navigational systems and	
					components.	493
				Other ATCOs monitoring the aircraft's trajectory fails to recognise		
49	49	Other ATCOs fail to detect conflict	ER31B42	the conflict	Traffic controller tiredness - Inadequate workload distribution	137
					Flaws in traffic controller requirements definition process and/or training	
					methodology	145
					System failure affecting the operation of primary instruments / displays or standby	
					instruments	26
					Airspace infringement	7:
_					Other cases of loss of separation	72
-					Prolonged loss of communication (PLOC) between pilot and controller	73
-			+		Convective weather encounter in traffic intensive airport proximity System failure affecting the operation of primary instruments / displays or standby	76
					instruments - ADS-B System	78
\dashv			+		Lack of English proficiency	132
Н			+		Incorrect or confusing / misleading ATC instructions	133
┪					Use of non-standard phraseology by pilot and/or controller	134
┪		1			Traffic controller tiredness - Inadequate workload distribution	137
П					Flaws in traffic controller requirements definition process and/or training	
					methodology	145
П					Lack of or poor communication quality	146
					Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	
					driver	148
			_		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	
Ц			1		or / and passive contribution to the PF duties	153
_		1	-		Pilot tiredness - Inadequate workload distribution	167
4		-	+		Flaws in pilot requirements definition process and/or training methodology	168
4			+		Hearback ommitted Flaws in aircraft system maintenance process definition - Communication equipment	169
		1	1		systems and components.	270
\dashv		1	+		Inadequate certification process and / or flaws in methodology concerning verification	
		1	1		of the system / product compliance with requirements - Communication equipment	
		1	1		systems and components.	27:
\dashv					Flaws in manufacturer quality control process - Communication equipment systems	m
		1	1		and components.	272
J					Altimeter setting error	274
_					Lack of adherence to SOP for take-off procedure in terms of altimeter callibration.	294
					Lack of adherence to Rules of the Air - adherence to Controller clearance	296
					Inadequate certification process and / or flaws in methodology concerning verification	
					of the system / product compliance with requirements - FMS subsystems and	
					of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299
					of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) Tactical or / and Planning Controller tiredness - Inadequate workload distribution	
					of the system / product compliance with requirements - FMS subsystems and components (autopiiot incl.) Tactical or / and Planning Controller tiredness - Inadequate workload distribution Flaws in Tactical or / and Planning Controller requirements definition process and/or	299 300
					of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) Tactical or / and Planning Controller tiredness - Inadequate workload distribution Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology	299 300 300
					of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) Tactical or / and Planning Controller tiredness - Inadequate workload distribution Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology Unintuitive and / or error prone system manual - communication equipment.	299 300
					of the system / product compliance with requirements - FMS subsystems and components (autopiiot incl.) Tactical or / and Planning Controller tiredness - Inadequate workload distribution Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology Unintuitive and / or error prone system manual - communication equipment. Flaws in manufacturer quality control process - FMS subsystem and components	299 300 300 300
					of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) Tactical or / and Planning Controller tiredness - Inadequate workload distribution Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology Unintuitive and / or error prone system manual - communication equipment. Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)	299 300 300 300 300
					of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) Tactical or / and Planning Controller tiredness - Inadequate workload distribution Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology Unintuitive and / or error prone system manual - communication equipment. Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.) Altitude deviation	299 300 300 300
					of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) Tactical or / and Planning Controller tiredness - Inadequate workload distribution Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology Unintuitive and / or error prone system manual - communication equipment. Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)	299 300 300 300 300 300 312
					of the system / product compliance with requirements - FMS subsystems and components (autopiiot incl.) Tactical or / and Planning Controller tiredness - Inadequate workload distribution Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology Unintuitive and / or error prone system manual - communication equipment. Flaws in manufacturer quality control process - FMS subsystem and components (autopiiot incl.) Attitude deviation Level bust (pilot lapse or late re-clearance by ATC)	300 300 300 300 300 310 310
					of the system / product compliance with requirements - FMS subsystems and components (autopiiot incl.) Tactical or / and Planning Controller tiredness - Inadequate workload distribution Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology Unintuitive and / or error prone system manual - communication equipment. Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.) Altitude deviation Level bust (pilot lapse or late re-clearance by ATC) Failure to comply with an altitude or speed restriction / constraint Navigation deviation Inadequate coordination between ATM centers and/or ATC sectors	300 300 300 300 310 310 311 311 312
					of the system / product compliance with requirements - FMS subsystems and components (autopiiot incl.) Tactical or / and Planning Controller tiredness - Inadequate workload distribution Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology Unintuitive and / or error prone system manual - communication equipment. Flaws in manufacturer quality control process - FMS subsystem and components (autopiiot incl.) Altitude deviation Level bust (pilot lapse or late re-clearance by ATC) Failure to comply with an altitude or speed restriction / constraint Navigation deviation Inadequate coordination between ATM centers and/or ATC sectors Flaws in Airspace and Air Traffic planning procedures design process	299 300 300 300 300 312 313 315 311
					of the system / product compliance with requirements - FMS subsystems and components (autopiiot incl.) Tactical or / and Planning Controller tiredness - Inadequate workload distribution Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology Unintuitive and / or error prone system manual - communication equipment. Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.) Altitude deviation Level bust (pilot lapse or late re-clearance by ATC) Failure to comply with an altitude or speed restriction / constraint Navigation deviation Inadequate coordination between ATM centers and/or ATC sectors	300 300 300 300 310 310 311 311 312



		Base events	Code	Definition	identifiable precursors	No.
					Lack of adherence of airlines to time contraints and deadlines in terms of providing	
_					the Network Manager Operation Centre with obligatory data.	327
					Inadequate certification process and / or flaws in methodology concerning verification	
+					of the system / product compliance with requirements - MTCD System	328
+					Lack of adherence of airlines to declared Flight Plan. Failure to identify the pre-tactical conflict before it reach the tactical controller	330
+					Lack of adherence to SOP for Airborne operation in terms of minimum seprataion	331
\dashv					Incorrect use of communication equipment	336
7					Military activity in controlled airport or located within controlled area	339
					General aviation activity in controlled airport or located within controlled area	340
					Intensified traffic related to general aviation activity e. g. over GA airport / airfield	342
					Deviation from flight trajectory commanded by controller	343
					Flaws in aircraft system maintenance process definition - FMS subsystems and	
_					components (autopilot incl.)	410
					Flaws in aircraft system maintenance process definition - Onboard navigational	
4					systems and components	491
					Fig. 1. in an analysis of the second	407
+					Flaws in manufacturer quality control process - Fire extinguishing system components Flaws in manufacturer quality control process - Onboard navigational systems and	482
					components.	493
+				Other ATCOs recognise the conflict but fails to communicate with	components.	75.
50	50	ATCOs fail to communicate warning	ER31B43	the ATCO concerned	Traffic controller tiredness - Inadequate workload distribution	137
					Flaws in traffic controller requirements definition process and/or training	
					methodology	145
\dashv					System failure affecting the operation of primary instruments / displays or standby	
_1					instruments	26
⇉					Airspace infringement	71
\perp					Other cases of loss of separation	72
Ţ					Prolonged loss of communication (PLOC) between pilot and controller	73
4			<u> </u>		Convective weather encounter in traffic intensive airport proximity	76
					System failure affecting the operation of primary instruments / displays or standby	١.
+			-		instruments - ADS-B System	78
+			1	<u> </u>	Lack of English proficiency	132
+					Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller	133
+					Traffic controller tiredness - Inadequate workload distribution	137
+					Flaws in traffic controller requirements definition process and/or training	13/
					methodology	145
\dashv					Lack of or poor communication quality	146
\dashv					Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	
					driver	148
寸					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	
					or / and passive contribution to the PF duties	151
					Pilot tiredness - Inadequate workload distribution	167
					Flaws in pilot requirements definition process and/or training methodology	168
					Hearback ommitted	169
					Flaws in aircraft system maintenance process definition - Communication equipment	
4					systems and components.	270
					Inadequate certification process and / or flaws in methodology concerning verification	1
					of the system / product compliance with requirements - Communication equipment	274
+					systems and components.	271
					Flaws in manufacturer quality control process - Communication equipment systems and components.	272
+					Altimeter setting error	274
\dashv					Lack of adherence to SOP for take-off procedure in terms of altimeter callibration.	294
\dashv					Lack of adherence to Rules of the Air - adherence to Controller clearance	296
\dashv					Inadequate certification process and / or flaws in methodology concerning verification	
					of the system / product compliance with requirements - FMS subsystems and	
_1					components (autopilot incl.)	299
J					Tactical or / and Planning Controller tiredness - Inadequate workload distribution	300
Т					Flaws in Tactical or / and Planning Controller requirements definition process and/or	
					training methodology	301
4					Unintuitive and / or error prone system manual - communication equipment.	305
					Flaws in manufacturer quality control process - FMS subsystem and components	
+			-		(autopilot incl.) Altitude deviation	306
+			+		Altitude deviation Level bust (pilot lapse or late re-clearance by ATC)	312
+			1	<u> </u>	Level bust (pilot lapse or late re-clearance by ATC) Failure to comply with an altitude or speed restriction / constraint	315
+			 		Navigation deviation	317
+			 		Inadequate coordination between ATM centers and/or ATC sectors	321
+			1		Flaws in Airspace and Air Traffic planning procedures design process	323
+					Flaws in conflict and separation minima infringement detection / elimination	1
					procedures	326
\top					Lack of adherence of airlines to time contraints and deadlines in terms of providing	Т
_			<u> </u>		the Network Manager Operation Centre with obligatory data.	327
\top					Inadequate certification process and / or flaws in methodology concerning verification	1
Ш					of the system / product compliance with requirements - MTCD System	328
_[Lack of adherence of airlines to declared Flight Plan.	329
4					Failure to identify the pre-tactical conflict before it reach the tactical controller	330
4					Lack of adherence to SOP for Airborne operation in terms of minimum seprataion	331
+					Incorrect use of communication equipment	336
+			-		Military activity in controlled airport or located within controlled area	339
+			-		General aviation activity in controlled airport or located within controlled area	340
+					Intensified traffic related to general aviation activity e. g. over GA airport / airfield	342
+					Deviation from flight trajectory commanded by controller Flaws in aircraft system maintenance process definition - FMS subsystems and	543
					components (autopilot incl.)	410
+					Flaws in aircraft system maintenance process definition - Onboard navigational	410
			1		systems and components	491
+					systems and components	100



		Base events	Code	Definition	identifiable precursors	No.
П					Flaws in manufacturer quality control process - Onboard navigational systems and	
Н		ATCO fails to recover separation in		ATCO is informed by other ATCO of a conflict but fails to resolve it	components.	493
51	51	time	ER31B44	in time	Traffic controller tiredness - Inadequate workload distribution	137
					Flaws in traffic controller requirements definition process and/or training	1.45
\dashv		<u> </u>			methodology Flaws in Airspace and Air Traffic planning procedures design process	323
П					System failure affecting the operation of primary instruments / displays or standby	
					instruments	26
-					Airspace infringement Other cases of loss of separation	71
\exists					Prolonged loss of communication (PLOC) between pilot and controller	73
					Convective weather encounter in traffic intensive airport proximity	76
					System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System	78
\exists					Lack of English proficiency	132
					Incorrect or confusing / misleading ATC instructions	133
_					Use of non-standard phraseology by pilot and/or controller	134
\exists					Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training	137
					methodology	145
_					Lack of or poor communication quality	146
					Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	148
П					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	
					or / and passive contribution to the PF duties	151
-					Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167
					Hearback ommitted	169
П					Flaws in aircraft system maintenance process definition - Communication equipment	
\dashv					systems and components. Inadequate certification process and / or flaws in methodology concerning verification	270
					of the system / product compliance with requirements - Communication equipment	1
					systems and components.	271
					Flaws in manufacturer quality control process - Communication equipment systems	277
\dashv					and components. Altimeter setting error	272
					Lack of adherence to SOP for take-off procedure in terms of altimeter callibration.	294
					Lack of adherence to Rules of the Air - adherence to Controller clearance	296
					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and	1
					components (autopilot incl.)	299
					Tactical or / and Planning Controller tiredness - Inadequate workload distribution	300
					Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology	301
\exists					Unintuitive and / or error prone system manual - communication equipment.	305
					Flaws in manufacturer quality control process - FMS subsystem and components	
_					(autopilot incl.)	306
\dashv		+			Altitude deviation Level bust (pilot lapse or late re-clearance by ATC)	312
					Failure to comply with an altitude or speed restriction / constraint	315
					Navigation deviation	317
-					Inadequate coordination between ATM centers and/or ATC sectors Flaws in Airspace and Air Traffic planning procedures design process	321
\exists					Flaws in conflict and separation minima infringement detection / elimination	32.
					procedures	326
					Lack of adherence of airlines to time contraints and deadlines in terms of providing	327
\exists					the Network Manager Operation Centre with obligatory data. Inadequate certification process and / or flaws in methodology concerning verification	-
					of the system / product compliance with requirements - MTCD System	328
					Lack of adherence of airlines to declared Flight Plan.	329
\dashv					Failure to identify the pre-tactical conflict before it reach the tactical controller Lack of adherence to SOP for Airborne operation in terms of minimum seprataion	330
					Incorrect use of communication equipment	336
					Military activity in controlled airport or located within controlled area	339
-					General aviation activity in controlled airport or located within controlled area Intensified traffic related to general aviation activity e. g. over GA airport / airfield	340
\exists					Deviation from flight trajectory commanded by controller	343
					Flaws in aircraft system maintenance process definition - FMS subsystems and	
4					components (autopilot incl.)	410
					Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491
_					Flaws in manufacturer quality control process - Fire extinguishing system components	482
					Flaws in manufacturer quality control process - Onboard navigational systems and components.	493
		Flight crew fails to detect and resolve				1.5.
Ш	Ш	conflict			Flight crew fails to detect and resolve conflict	_
52	61	2 ACAS not installed	ER31B21	Airborne collision avoidance system (ACAS) is not installed on board the aircraft	Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ACAS installed on aircraft.	347
ے د	32	, io so not installed	CU21021	and district	System failure affecting the operation of primary instruments / displays or standby	541
					instruments	26
Ц					Airspace infringement	71
\dashv					Other cases of loss of separation Prolonged loss of communication (PLOC) between pilot and controller	72
					Convective weather encounter in traffic intensive airport proximity	76
					System failure affecting the operation of primary instruments / displays or standby	
_					instruments - ADS-B System	122
		+	-		Lack of English proficiency Incorrect or confusing / misleading ATC instructions	132
\neg		1	1			
					Use of non-standard phraseology by pilot and/or controller	134



		Base events	Code	Definition	identifiable precursors	No.
П					Flaws in traffic controller requirements definition process and/or training	
Н					methodology Lack of or poor communication quality	145 146
H					Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	140
Ц					driver	148
					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
H					Pilot tiredness - Inadequate workload distribution	167
					Flaws in pilot requirements definition process and/or training methodology	168
Ш					Hearback ommitted	169
					Flaws in aircraft system maintenance process definition - Communication equipment systems and components.	270
Н					Inadequate certification process and / or flaws in methodology concerning verification	270
					of the system / product compliance with requirements - Communication equipment	
Н					systems and components. Flaws in manufacturer quality control process - Communication equipment systems	271
					and components.	272
\Box					Altimeter setting error	274
					Lack of adherence to SOP for take-off procedure in terms of altimeter callibration.	294
\dashv					Lack of adherence to Rules of the Air - adherence to Controller clearance Inadequate certification process and / or flaws in methodology concerning verification	296
					of the system / product compliance with requirements - FMS subsystems and	
					components (autopilot incl.)	299
_					Tactical or / and Planning Controller tiredness - Inadequate workload distribution	300
					Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology	301
\dashv					Unintuitive and / or error prone system manual - communication equipment.	305
\dashv					Flaws in manufacturer quality control process - FMS subsystem and components	1
_					(autopilot incl.)	306
4					Altitude deviation Level bust (pilot lapse or late re-clearance by ATC)	312 313
\dashv					Failure to comply with an altitude or speed restriction / constraint	313
					Navigation deviation	317
П					Inadequate coordination between ATM centers and/or ATC sectors	321
\dashv					Flaws in Airspace and Air Traffic planning procedures design process Flaws in conflict and separation minima infringement detection / elimination	323
					procedures	326
\Box					Lack of adherence of airlines to time contraints and deadlines in terms of providing	
_					the Network Manager Operation Centre with obligatory data.	327
					Inadequate certification process and / or flaws in methodology concerning verification	328
\dashv					of the system / product compliance with requirements - MTCD System Lack of adherence of airlines to declared Flight Plan.	328
\dashv					Failure to identify the pre-tactical conflict before it reach the tactical controller	330
					Lack of adherence to SOP for Airborne operation in terms of minimum seprataion	331
Н					Incorrect use of communication equipment	336
\dashv					Military activity in controlled airport or located within controlled area General aviation activity in controlled airport or located within controlled area	339 340
\Box					Intensified traffic related to general aviation activity e. g. over GA airport / airfield	342
					Deviation from flight trajectory commanded by controller	343
					Flaws in aircraft system maintenance process definition - FMS subsystems and	440
\dashv					components (autopilot incl.) Flaws in aircraft system maintenance process definition - Onboard navigational	410
					systems and components	491
T						
\dashv					Flaws in manufacturer quality control process - Fire extinguishing system components	482
					Flaws in manufacturer quality control process - Onboard navigational systems and components.	493
\dashv					Traffic controller tiredness - Inadequate workload distribution	137
П					Flaws in traffic controller requirements definition process and/or training	
\dashv					methodology Flaws in Airspace and Air Traffic planning procedures design process	145 323
\dashv					Lack of adherence to the current technology standards in terms of flight safety	323
					supporting systems. Lack of STCA System.	344
Д					Lack of adherence to regulations concerning independent ATCO monitoring	346
					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - STCA System	351
\dashv				ACAS fails to give the pilot a resolution advisory (RA) in time to	or the system / product compilance with requirements - STCA system	221
53	53	ACAS fails to give RA in time	ER31B22	resolve a conflict	Failures affecting TCAS operation	74
T						
					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ACAS system components	290
\dashv					System failure affecting the operation of primary instruments / displays or standby	290
Ш					instruments	26
					Airspace infringement	71 72
\dashv					Other cases of loss of separation Prolonged loss of communication (PLOC) between pilot and controller	
+					Other cases of loss of separation Prolonged loss of communication (PLOC) between pilot and controller Convective weather encounter in traffic intensive airport proximity	73 76
					Prolonged loss of communication (PLOC) between pilot and controller Convective weather encounter in traffic intensive airport proximity System failure affecting the operation of primary instruments / displays or standby	73 76
					Prolonged loss of communication (PLOC) between pilot and controller Convective weather encounter in traffic intensive airport proximity System failure affecting the operation of primary instruments / displays or standby Instruments - ADS-B System	73 76 78
					Prolonged loss of communication (PLOC) between pilot and controller Convective weather encounter in traffic intensive airport proximity System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System Lack of English proficiency	73 76 78 132
					Prolonged loss of communication (PLOC) between pilot and controller Convective weather encounter in traffic intensive airport proximity System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System Lack of English proficiency Incorrect or confusing / misleading ATC instructions	73 76 78
					Prolonged loss of communication (PLOC) between pilot and controller Convective weather encounter in traffic intensive airport proximity System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System Lack of English proficiency	73 76 78 132 133
					Prolonged loss of communication (PLOC) between pilot and controller Convective weather encounter in traffic intensive airport proximity System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training	73 76 78 132 133 134 137
					Prolonged loss of communication (PLOC) between pilot and controller Convective weather encounter in traffic intensive airport proximity System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology	73 76 78 132 133 134 137
					Prolonged loss of communication (PLOC) between pilot and controller Convective weather encounter in traffic intensive airport proximity System failure affecting the operation of primary instruments / displays or standby Instruments - ADS-B System Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality	73 76 78 132 133 134 137
					Prolonged loss of communication (PLOC) between pilot and controller Convective weather encounter in traffic intensive airport proximity System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology	73 76 78 132 133 134 137
					Prolonged loss of communication (PLOC) between pilot and controller Convective weather encounter in traffic intensive airport proximity System failure affecting the operation of primary instruments / displays or standby Instruments - ADS-B System Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller triedness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	73 76 78 132 133 134 137 145 146
					Prolonged loss of communication (PLOC) between pilot and controller Convective weather encounter in traffic intensive airport proximity System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	73 76 78 132 133 134 137 145



		Base events	Code	Definition	identifiable precursors	No.
		buse events		Delinition	Hearback ommitted	169
					Flaws in aircraft system maintenance process definition - Communication equipment	
					systems and components.	270
					Inadequate certification process and / or flaws in methodology concerning verification	1
					of the system / product compliance with requirements - Communication equipment	
Ш					systems and components.	271
					Flaws in manufacturer quality control process - Communication equipment systems	
Ш					and components.	272
Щ					Altimeter setting error	274
Щ					Lack of adherence to SOP for take-off procedure in terms of altimeter callibration.	294
Щ					Lack of adherence to Rules of the Air - adherence to Controller clearance	296
					Inadequate certification process and / or flaws in methodology concerning verification	1
					of the system / product compliance with requirements - FMS subsystems and	
Щ					components (autopilot incl.)	299
Н					Tactical or / and Planning Controller tiredness - Inadequate workload distribution	300
					Flaws in Tactical or / and Planning Controller requirements definition process and/or	201
\vdash					training methodology Unintuitive and / or error prone system manual - communication equipment.	301
\vdash			-			305
					Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)	306
\dashv					Altitude deviation	312
\dashv					Level bust (pilot lapse or late re-clearance by ATC)	313
\dashv			+		Failure to comply with an altitude or speed restriction / constraint	315
\dashv			+		Navigation deviation	317
			+		Inadequate coordination between ATM centers and/or ATC sectors	321
\dashv			 		Flaws in Airspace and Air Traffic planning procedures design process	323
\dashv			+		Flaws in conflict and separation minima infringement detection / elimination	+ 323
			1		procedures	326
\dashv			<u> </u>		Lack of adherence of airlines to time contraints and deadlines in terms of providing	1320
			1		the Network Manager Operation Centre with obligatory data.	327
\dashv			†		Inadequate certification process and / or flaws in methodology concerning verification	
- 1			1		of the system / product compliance with requirements - MTCD System	328
\dashv					Lack of adherence of airlines to declared Flight Plan.	329
\dashv					Failure to identify the pre-tactical conflict before it reach the tactical controller	330
\dashv			+		Lack of adherence to SOP for Airborne operation in terms of minimum seprataion	331
\dashv					Incorrect use of communication equipment	336
\dashv					Military activity in controlled airport or located within controlled area	339
\dashv					General aviation activity in controlled airport or located within controlled area	340
\dashv					Intensified traffic related to general aviation activity e. g. over GA airport / airfield	342
\dashv			-		Deviation from flight trajectory commanded by controller	343
\dashv			-			343
					Flaws in aircraft system maintenance process definition - FMS subsystems and	410
-					components (autopilot incl.)	410
					Flaws in aircraft system maintenance process definition - Onboard navigational	
\vdash					systems and components	491
Н					Flaws in manufacturer quality control process - Fire extinguishing system components	482
					Flaws in manufacturer quality control process - Onboard navigational systems and	
Н					components.	493
\vdash					Traffic controller tiredness - Inadequate workload distribution	137
					Flaws in traffic controller requirements definition process and/or training	1 445
_					methodology	145
_					Flaws in Airspace and Air Traffic planning procedures design process	323
					Lack of adherence to the current technology standards in terms of flight safety	
-					supporting systems. Lack of STCA System.	344
_					Lack of adherence to regulations concerning independent ATCO monitoring	346
					Inadequate certification process and / or flaws in methodology concerning verification	1
_					of the system / product compliance with requirements - STCA System	
						351
الرج	54	Dilet feilete en la Committe	ED24522	An RA is given but the pilot fails to respond in time to resolve the	TCAS DA sussets (see see see see see see see see see s	
54		Pilot fails to respond to RA in time	ER31B23	An RA is given but the pilot fails to respond in time to resolve the conflict	TCAS RA events (genuine or spurious)	70
54		Pilot fails to respond to RA in time	ER31B23		Pilot tiredness - Inadequate workload distribution	70 167
54		Pilot fails to respond to RA in time	ER31B23		Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	70 167 168
54		Pilot fails to respond to RA in time	ER31B23		Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Late or inadequate response to ACAS warning	70 167
54		Pilot fails to respond to RA in time	ER31B23		Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Late or inadequate response to ACAS warning System failure affecting the operation of primary instruments / displays or standby	70 167 168 349
54		Pilot fails to respond to RA in time	ER31B23		Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Late or inadequate response to ACAS warning System failure affecting the operation of primary instruments / displays or standby instruments	70 167 168 349
54		Pilot fails to respond to RA in time	ER31B23		Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Late or inadequate response to ACAS warning System failure affecting the operation of primary instruments / displays or standby Instruments Airspace infringement	70 167 168 349 26
54		Pilot fails to respond to RA in time	ER31B23		Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Late or inadequate response to ACAS warning System failure affecting the operation of primary instruments / displays or standby instruments Airspace infringement Other cases of loss of separation	70 167 168 349 26 71
54		Pilot fails to respond to RA in time	ER31B23		Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Late or inadequate response to ACAS warning System failure affecting the operation of primary instruments / displays or standby instruments Airspace infringement Other cases of loss of separation Prolonged loss of communication (PLOC) between pilot and controller	70 167 168 349 26 71 72
54		Pilot fails to respond to RA in time	ER31B23		Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Late or inadequate response to ACAS warning System failure affecting the operation of primary instruments / displays or standby instruments Airspace infringement Other cases of loss of separation Prolonged loss of communication (PLOC) between pilot and controller Convective weather encounter in traffic intensive airport proximity	70 167 168 349 26 71
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54		Pilot fails to respond to RA in time	ER31B23		Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Late or inadequate response to ACAS warning System failure affecting the operation of primary instruments / displays or standby instruments Airspace infringement Other cases of loss of separation Prolonged loss of communication (PLOC) between pilot and controller Convective weather encounter in traffic intensive airport proximity System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology	700 167 168 349 266 71 72 73 766 788 1324 133 134 145
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54		Pilot fails to respond to RA in time	ER31B23		Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Late or inadequate response to ACAS warning System failure affecting the operation of primary instruments / displays or standby instruments Airspace infringement Other cases of loss of separation Prolonged loss of communication (PLOC) between pilot and controller Convective weather encounter in traffic intensive airport proximity System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	700 1677 1688 3499 266 71 727 73 766 788 1323 1334 1345 1456 1446
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54		Pilot fails to respond to RA in time	ER31B23		Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Late or inadequate response to ACAS warning System failure affecting the operation of primary instruments / displays or standby instruments Airspace infringement Other cases of loss of separation Prolonged loss of communication (PLOC) between pilot and controller Convective weather encounter in traffic intensive airport proximity System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	700 167 168 349 266 71 72 73 76 78 132 133 134 145 146 148
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54		Pilot fails to respond to RA in time	ER31B23		Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Late or inadequate response to ACAS warning System failure affecting the operation of primary instruments / displays or standby instruments Airspace infringement Other cases of loss of separation Prolonged loss of communication (PLOC) between pilot and controller Convective weather encounter in traffic intensive airport proximity System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - landequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in traffic sadquate workload distribution Flaws in traffic sadquate workload distribution process and/or training methodology Hearback ommitted	700 1676 1688 349 266 71 72 73 766 788 1322 133 134 137 145 148 148 151 167 168
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					Tactical or / and Planning Controller tiredness - Inadequate workload distribution	300
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					training methodology	301
Ш					Unintuitive and / or error prone system manual - communication equipment.	305
					Flaws in manufacturer quality control process - FMS subsystem and components	200
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					Inadequate coordination between ATM centers and/or ATC sectors	321
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					Lack of adherence of airlines to time contraints and deadlines in terms of providing	
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Flaws in conflict and separation minima infringement detection / elimination procedures Lack of adherence of airlines to time contraints and deadlines in terms of providing						methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Hearback ommitted Flaws in aircraft system maintenance process definition - Communication equipment systems and components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components. Flaws in manufacturer quality control process - Communication equipment systems and components. Altimeter setting error Lack of adherence to SOP for take-off procedure in terms of altimeter callibration. Lack of adherence to Rules of the Air - adherence to Controller clearance Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) Tactical or / and Planning Controller tiredness - Inadequate workload distribution Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology Unintuitive and / or error prone system manual - communication equipment. Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.) Altitude deviation Level bust (pilot lapse or late re-clearance by ATC) Failure to comply with an altitude or speed restriction / constraint	145 146 148 151 167 168 169 270 271 272 274 294 299 300 301 305 306 312 313 313 315 317
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Lack of adherence of airlines to time contraints and deadlines in terms of providing						methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Hearback ommitted Flaws in aircraft system maintenance process definition - Communication equipment systems and components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components. Flaws in manufacturer quality control process - Communication equipment systems and components. Altimeter setting error Lack of adherence to SOP for take-off procedure in terms of altimeter callibration. Lack of adherence to Rules of the Air - adherence to Controller clearance Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) Tactical or / and Planning Controller tiredness - Inadequate workload distribution flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology Unintuitive and / or error prone system manual - communication equipment. Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.) Altitude deviation Level bust (pilot lapse or late re-clearance by ATC) Failure to comply with an altitude or speed restriction / constraint Navigation deviation Flaws in Airspace and Air Traffic planning procedures design process	145 146 148 151 167 168 169 270 271 272 274 294 299 300 301 305 306 312 313 313 315 317
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		Base events	Code	Definition	identifiable precursors	No.
		- Date events			Inadequate certification process and / or flaws in methodology concerning verification	
					of the system / product compliance with requirements - MTCD System	328
					Lack of adherence of airlines to declared Flight Plan.	329
					Failure to identify the pre-tactical conflict before it reach the tactical controller	330
					Lack of adherence to SOP for Airborne operation in terms of minimum seprataion	331
					Incorrect use of communication equipment	336
					Military activity in controlled airport or located within controlled area	339
					General aviation activity in controlled airport or located within controlled area	340
					Intensified traffic related to general aviation activity e. g. over GA airport / airfield	342
					Deviation from flight trajectory commanded by controller	343
					Flaws in aircraft system maintenance process definition - FMS subsystems and	
					components (autopilot incl.) Flaws in aircraft system maintenance process definition - Onboard navigational	410
					systems and components	491
					systems and components	491
					Flaws in manufacturer quality control process - Fire extinguishing system components	482
_					Flaws in manufacturer quality control process - The extinguishing system components Flaws in manufacturer quality control process - Onboard navigational systems and	402
					components.	493
					Traffic controller tiredness - Inadequate workload distribution	137
					Flaws in traffic controller requirements definition process and/or training	
					methodology	145
					Flaws in Airspace and Air Traffic planning procedures design process	323
					Lack of adherence to the current technology standards in terms of flight safety	
					supporting systems. Lack of STCA System.	344
					Lack of adherence to regulations concerning independent ATCO monitoring	346
					Inadequate certification process and / or flaws in methodology concerning verification	
		<u> </u>	<u> </u>		of the system / product compliance with requirements - STCA System	351
		Flight crew fail to observe visible		Pilots fail to observe visible aircraft in time to make avoidance		
57	57	aircraft in time	ER31B112	action	Adverse weather / poor visibility conditions / darkness	6
					Pilot tiredness - Inadequate workload distribution	167
					Flaws in pilot requirements definition process and/or training methodology	168
П					System failure affecting the operation of primary instruments / displays or standby	
					instruments	26
					Airspace infringement	71
					Other cases of loss of separation	72
					Prolonged loss of communication (PLOC) between pilot and controller	73
					Convective weather encounter in traffic intensive airport proximity	76
					System failure affecting the operation of primary instruments / displays or standby	
					instruments - ADS-B System	78
					Lack of English proficiency	132
					Incorrect or confusing / misleading ATC instructions	133
					Use of non-standard phraseology by pilot and/or controller	134
					Traffic controller tiredness - Inadequate workload distribution	137
					Flaws in traffic controller requirements definition process and/or training	
					methodology	145
					Lack of or poor communication quality	146
					Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	
					driver	148
					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	454
_					or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution	151 167
_						168
					Flaws in pilot requirements definition process and/or training methodology	169
_					Hearback ommitted	169
					Flaws in aircraft system maintenance process definition - Communication equipment systems and components.	270
					Inadequate certification process and / or flaws in methodology concerning verification	2/0
					of the system / product compliance with requirements - Communication equipment	
					systems and components.	271
\dashv		1	1		Flaws in manufacturer quality control process - Communication equipment systems	_/1
		Í.			and components.	272
\dashv		 			Altimeter setting error	274
-		<u> </u>			Lack of adherence to SOP for take-off procedure in terms of altimeter callibration.	294
-		<u> </u>			Lack of adherence to Rules of the Air - adherence to Controller clearance	296
					Inadequate certification process and / or flaws in methodology concerning verification	
					of the system / product compliance with requirements - FMS subsystems and	
					components (autopilot incl.)	299
					Tactical or / and Planning Controller tiredness - Inadequate workload distribution	300
					Flaws in Tactical or / and Planning Controller requirements definition process and/or	
					training methodology	301
					Unintuitive and / or error prone system manual - communication equipment.	305
			1		Flaws in manufacturer quality control process - FMS subsystem and components	
		Í.			(autopilot incl.)	306
			1		Altitude deviation	312
			1		Level bust (pilot lapse or late re-clearance by ATC)	313
			1		Failure to comply with an altitude or speed restriction / constraint	315
						317
					Navigation deviation	31,
					Navigation deviation Inadequate coordination between ATM centers and/or ATC sectors	321
					Inadequate coordination between ATM centers and/or ATC sectors	321
					Inadequate coordination between ATM centers and/or ATC sectors Flaws in Airspace and Air Traffic planning procedures design process Flaws in conflict and separation minima infringement detection / elimination procedures	321
					Inadequate coordination between ATM centers and/or ATC sectors Flaws in Airspace and Air Traffic planning procedures design process Flaws in conflict and separation minima infringement detection / elimination	321 323
					Inadequate coordination between ATM centers and/or ATC sectors Flaws in Airspace and Air Traffic planning procedures design process Flaws in conflict and separation minima infringement detection / elimination procedures	321 323
					Inadequate coordination between ATM centers and/or ATC sectors Flaws in Airspace and Air Traffic planning procedures design process Flaws in conflict and separation minima infringement detection / elimination procedures Lack of adherence of airlines to time contraints and deadlines in terms of providing	321 323 326
					Inadequate coordination between ATM centers and/or ATC sectors Flaws in Airspace and Air Traffic planning procedures design process Flaws in conflict and separation minima infringement detection / elimination procedures Lack of adherence of airlines to time contraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data.	321 323 326
					Inadequate coordination between ATM centers and/or ATC sectors Flaws in Airspace and Air Traffic planning procedures design process Flaws in conflict and separation minima infringement detection / elimination procedures Lack of adherence of airlines to time contraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data. Inadequate certification process and / or flaws in methodology concerning verification	321 323 326 327
					Inadequate coordination between ATM centers and/or ATC sectors Flaws in Airspace and Air Traffic planning procedures design process Flaws in conflict and separation minima infringement detection / elimination procedures Lack of adherence of airlines to time contraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MTCD System	321 323 326 327 328
					inadequate coordination between ATM centers and/or ATC sectors Flaws in Airspace and Air Traffic planning procedures design process flaws in conflict and separation minima infringement detection / elimination procedures Lack of adherence of airlines to time contraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MTCD System Lack of adherence of airlines to declared Flight Plan. Failure to identify the pre-tactical conflict before it reach the tactical controller	321 323 326 327 328 329 330
					Inadequate coordination between ATM centers and/or ATC sectors Flaws in Airspace and Air Traffic planning procedures design process Flaws in conflict and separation minima infringement detection / elimination procedures Lack of adherence of airlines to time contraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MTCD System Lack of adherence of airlines to declared Flight Plan.	321 323 326 327 328 329
					Inadequate coordination between ATM centers and/or ATC sectors Flaws in Airspace and Air Traffic planning procedures design process Flaws in conflict and separation minima infringement detection / elimination procedures Lack of adherence of airlines to time contraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MTCD System Lack of adherence of airlines to declared Flight Plan. Failure to identify the pre-tactical conflict before it reach the tactical controller Lack of adherence to SOP for Airborne operation in terms of minimum seprataion Incorrect use of communication equipment	321 323 326 327 328 329 330 331
					Inadequate coordination between ATM centers and/or ATC sectors Flaws in Airspace and Air Traffic planning procedures design process Flaws in conflict and separation minima infringement detection / elimination procedures Lack of adherence of airlines to time contraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MTCD System Lack of adherence of airlines to declared Flight Plan. Failure to identify the pre-tactical conflict before it reach the tactical controller Lack of adherence to SOP for Airborne operation in terms of minimum sepratation	321 323 326 327 328 329 330 331 336
					Inadequate coordination between ATM centers and/or ATC sectors Flaws in Airspace and Air Traffic planning procedures design process flaws in conflict and separation minima infringement detection / elimination procedures Lack of adherence of airlines to time contraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MTCD System Lack of adherence of airlines to declared Flight Plan. Failure to identify the pre-tactical conflict before it reach the tactical controller Lack of adherence to SOP for Airborne operation in terms of minimum seprataion incorrect use of communication equipment Military activity in controlled airport or located within controlled area	321 323 326 327 328 329 330 331 336 339



		Base events	Code	Definition	identifiable precursors	No.
П		Date events			Flaws in aircraft system maintenance process definition - FMS subsystems and	
Н					components (autopilot incl.)	410
					Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491
П						
Щ					Flaws in manufacturer quality control process - Fire extinguishing system components	482
					Flaws in manufacturer quality control process - Onboard navigational systems and components.	493
Н					Traffic controller tiredness - Inadequate workload distribution	137
П					Flaws in traffic controller requirements definition process and/or training	
Ш					methodology	145
Н			-		Flaws in Airspace and Air Traffic planning procedures design process Lack of adherence to the current technology standards in terms of flight safety	323
					supporting systems. Lack of STCA System.	344
					Lack of adherence to regulations concerning independent ATCO monitoring	346
					Inadequate certification process and / or flaws in methodology concerning verification	
Н		Pilot fails to take avoidance action in		Pilots fail to make appropriate avoidance action, having observed	of the system / product compliance with requirements - STCA System	351
58	58	time	ER31B113	the other aircraft with sufficient time to take the necessary action	Pilot tiredness - Inadequate workload distribution	167
				, , , , , , , , , , , , , , , , , , , ,	Flaws in pilot requirements definition process and/or training methodology	168
					System failure affecting the operation of primary instruments / displays or standby	
Н					instruments Aircrang infringement	26 71
\dashv					Airspace infringement Other cases of loss of separation	72
П					Prolonged loss of communication (PLOC) between pilot and controller	73
口					Convective weather encounter in traffic intensive airport proximity	76
- [1		System failure affecting the operation of primary instruments / displays or standby	
\dashv			 		instruments - ADS-B System Lack of English proficiency	78 132
\dashv			 		Incorrect or confusing / misleading ATC instructions	133
					Use of non-standard phraseology by pilot and/or controller	134
\Box					Traffic controller tiredness - Inadequate workload distribution	137
					Flaws in traffic controller requirements definition process and/or training methodology	145
\dashv					Lack of or poor communication quality	145
\dashv					Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	
					driver	148
					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	
\dashv					or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution	151 167
\dashv					Flaws in pilot requirements definition process and/or training methodology	168
П					Hearback ommitted	169
П					Flaws in aircraft system maintenance process definition - Communication equipment	
Н					systems and components.	270
					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment	
					systems and components.	271
П					Flaws in manufacturer quality control process - Communication equipment systems	
Н					and components.	272
\dashv					Altimeter setting error Lack of adherence to SOP for take-off procedure in terms of altimeter callibration.	274 294
\dashv					Lack of adherence to Rules of the Air - adherence to Controller clearance	296
					Inadequate certification process and / or flaws in methodology concerning verification	
					of the system / product compliance with requirements - FMS subsystems and	
\dashv					components (autopilot incl.) Tactical or / and Planning Controller tiredness - Inadequate workload distribution	299 300
\dashv					Flaws in Tactical or / and Planning Controller requirements definition process and/or	300
					training methodology	301
Ц					Unintuitive and / or error prone system manual - communication equipment.	305
					Flaws in manufacturer quality control process - FMS subsystem and components	206
\vdash			 		(autopilot incl.) Altitude deviation	306 312
H					Level bust (pilot lapse or late re-clearance by ATC)	313
					Failure to comply with an altitude or speed restriction / constraint	315
\dashv			 		Navigation deviation	317
\dashv			-		Inadequate coordination between ATM centers and/or ATC sectors Flaws in Airspace and Air Traffic planning procedures design process	321 323
\dashv			 		Flaws in conflict and separation minima infringement detection / elimination	223
					procedures	326
П					Lack of adherence of airlines to time contraints and deadlines in terms of providing	
\dashv			-		the Network Manager Operation Centre with obligatory data. Inadequate certification process and / or flaws in methodology concerning verification	327
- [1		of the system / product compliance with requirements - MTCD System	328
_				_	Lack of adherence of airlines to declared Flight Plan.	329
\Box					Failure to identify the pre-tactical conflict before it reach the tactical controller	330
\dashv		I	1		Lack of adherence to SOP for Airborne operation in terms of minimum seprataion Incorrect use of communication equipment	331
_			1		non order case of communication equipment	336
- 1						330
\dashv					Military activity in controlled airport or located within controlled area General aviation activity in controlled airport or located within controlled area	339 340
					Military activity in controlled airport or located within controlled area	340 342
					Military activity in controlled airport or located within controlled area General aviation activity in controlled airport or located within controlled area Intensified traffic related to general aviation activity e.g. over GA airport / airfield Deviation from flight trajectory commanded by controller	340
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					Military activity in controlled airport or located within controlled area General aviation activity in controlled airport or located within controlled area Intensified traffic related to general aviation activity e.g. over GA airport / airfield Deviation from flight trajectory commanded by controller Flaws in aircraft system maintenance process definition - FMS subsystems and	340 342 343
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59		Base events	Code	Definition	Flaws in Airspace and Air Traffic planning procedures design process	No. 323
i9						
i9					Lack of adherence to the current technology standards in terms of flight safety	
i9					supporting systems. Lack of STCA System.	344
;9					Lack of adherence to regulations concerning independent ATCO monitoring	346
59					Inadequate certification process and / or flaws in methodology concerning verification	254
59		Visual avoidance invalidated by other		Pilot's response is cancelled out by opposing manoeuvre from the	of the system / product compliance with requirements - STCA System	351
	59	aircraft	ER31B114	other aircraft	TCAS RA events (genuine or spurious)	70
-1					System failure affecting the operation of primary instruments / displays or standby	20
+					instruments Airspace infringement	26 71
+					Other cases of loss of separation	72
十					Prolonged loss of communication (PLOC) between pilot and controller	73
I					Convective weather encounter in traffic intensive airport proximity	76
					System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System	78
+					Lack of English proficiency	132
+					Incorrect or confusing / misleading ATC instructions	133
I					Use of non-standard phraseology by pilot and/or controller	134
Ŧ					Traffic controller tiredness - Inadequate workload distribution	137
					Flaws in traffic controller requirements definition process and/or training	145
+					methodology Lack of or poor communication quality	145
+					Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	
\perp					driver	148
Т					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	
+	\Box				or / and passive contribution to the PF duties	151
+	-				Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168
+					Hearback ommitted	169
+					Flaws in aircraft system maintenance process definition - Communication equipment	100
L					systems and components.	270
Т					Inadequate certification process and / or flaws in methodology concerning verification	
					of the system / product compliance with requirements - Communication equipment	274
+	_				systems and components. Flaws in manufacturer quality control process - Communication equipment systems	271
					and components.	272
十					Altimeter setting error	274
I					Lack of adherence to SOP for take-off procedure in terms of altimeter callibration.	294
Ŧ					Lack of adherence to Rules of the Air - adherence to Controller clearance	296
					Inadequate certification process and / or flaws in methodology concerning verification	
					of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299
+					Tactical or / and Planning Controller tiredness - Inadequate workload distribution	300
十					Flaws in Tactical or / and Planning Controller requirements definition process and/or	
					training methodology	301
I					Unintuitive and / or error prone system manual - communication equipment.	305
					Flaws in manufacturer quality control process - FMS subsystem and components	200
+					(autopilot incl.) Altitude deviation	306 312
+	-				Level bust (pilot lapse or late re-clearance by ATC)	313
十					Failure to comply with an altitude or speed restriction / constraint	315
I					Navigation deviation	317
Ŧ					Inadequate coordination between ATM centers and/or ATC sectors	321
+					Flaws in Airspace and Air Traffic planning procedures design process	323
					Flaws in conflict and separation minima infringement detection / elimination procedures	326
+					Lack of adherence of airlines to time contraints and deadlines in terms of providing	320
					the Network Manager Operation Centre with obligatory data.	327
Т					Inadequate certification process and / or flaws in methodology concerning verification	
4					of the system / product compliance with requirements - MTCD System	328
+	-				Lack of adherence of airlines to declared Flight Plan.	329
+					Failure to identify the pre-tactical conflict before it reach the tactical controller Lack of adherence to SOP for Airborne operation in terms of minimum seprataion	330
+					Incorrect use of communication equipment	336
工					Military activity in controlled airport or located within controlled area	339
Ţ					General aviation activity in controlled airport or located within controlled area	340
+	-				Intensified traffic related to general aviation activity e. g. over GA airport / airfield	342
+					Deviation from flight trajectory commanded by controller Flaws in aircraft system maintenance process definition - FMS subsystems and	343
					components (autopilot incl.)	410
+					Flaws in aircraft system maintenance process definition - Onboard navigational	710
\perp					systems and components	491
Т						
+	\Box				Flaws in manufacturer quality control process - Fire extinguishing system components	482
					Flaws in manufacturer quality control process - Onboard navigational systems and components.	493
+					Traffic controller tiredness - Inadequate workload distribution	137
+					Flaws in traffic controller requirements definition process and/or training	-25/
L					methodology	145
Ŧ					Flaws in Airspace and Air Traffic planning procedures design process	323
					Lack of adherence to the current technology standards in terms of flight safety	
+	-				supporting systems. Lack of STCA System.	344
+	_				Lack of adherence to regulations concerning independent ATCO monitoring Inadequate certification process and / or flaws in methodology concerning verification	346
					of the system / product compliance with requirements - STCA System	351
+		Ineffective visual warning on other		Pilots on the conflicting aircraft fail to resolve the conflict using see	, as a processing processing states and stat	
- 1		aircraft	ER31B12	& avoid techniques, given similar failure on the subject aircraft	Pilot tiredness - Inadequate workload distribution	167
50					Flaws in pilot requirements definition process and/or training methodology	168
50						
50					Inappropriate visual avoidance maneuver System failure affecting the operation of primary instruments / displays or standby	318



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Given failure of on board detection and resolution of the conflict, a collision avoidance essential ER3IC3 collision is not avoided through providence not identifiable at that level System failure affecting the operation of primary instruments / displays or standby instruments Airspace infringement 71 Other cases of loss of separation 72 Prolonged loss of communication (PLOC) between pilot and controller 73 Convective weather encounter in traffic intensive airport proximity 76 System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System 78 Lack of English proficiency 132 Incorrect or confusing / misleading ATC instructions 133 Use of non-standard phraseology by pilot and/or controller 134 Traffic controller triedness - Inadequate workload distribution 137 Flaws in traffic controller requirements definition process and/or training							
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Use of non-standard phraseology by pilot and/or controller 134 Traffic controller tiredness - Inadequate workload distribution 137 Flaws in traffic controller requirements definition process and/or training	╛					Lack of English proficiency	
Traffic controller tiredness - Inadequate workload distribution 137 Flaws in traffic controller requirements definition process and/or training	Д						
Flaws in traffic controller requirements definition process and/or training	\dashv						
	\vdash						137
						methodology	145



	Base events	Code	Definition identifiable precursors		No
_			Lack of or poor communication qu	•	1
				of communication between ATC and pilot / vehicle	
4			driver		1
				rms of PNF flight parameters / situation monitoring	
			or / and passive contribution to th		1
			Pilot tiredness - Inadequate workle	oad distribution	1
			Flaws in pilot requirements definit	ion process and/or training methodology	1
Т			Hearback ommitted		1
Т			Flaws in aircraft system maintenar	nce process definition - Communication equipment	Т
			systems and components.		2
T			Inadequate certification process a	nd / or flaws in methodology concerning verification	n
1			of the system / product compliance	e with requirements - Communication equipment	
ı			systems and components.		2
Ť			Flaws in manufacturer quality cont	trol process - Communication equipment systems	T
ı			and components.	.,,	2
†			Altimeter setting error		2
+				off procedure in terms of altimeter callibration.	2
+				Air - adherence to Controller clearance	2
+				nd / or flaws in methodology concerning verification	_
1		I		e with requirements - FMS subsystems and	Т
ı		1	components (autopilot incl.)	- with requirements - rivis subsystems dilu	1
+		 		or tiredness. Inadequate workland distribution	1
╀		 		er tiredness - Inadequate workload distribution	۴
ı		I		Controller requirements definition process and/or	1.
Ļ			training methodology		4
Ļ				stem manual - communication equipment.	1
l				trol process - FMS subsystem and components	Т
L			(autopilot incl.)		1
L			Altitude deviation		
Γ			Level bust (pilot lapse or late re-cle	earance by ATC)	Т
Γ			Failure to comply with an altitude	or speed restriction / constraint	Т
T			Navigation deviation		Т
t			Inadequate coordination between	ATM centers and/or ATC sectors	
t			Flaws in Airspace and Air Traffic pl		1
t				inima infringement detection / elimination	十
l			procedures	mind miningement detection / cimination	1:
t			·	ne contraints and deadlines in terms of providing	+
ı			the Network Manager Operation 0		
╀					
l				nd / or flaws in methodology concerning verification	
Ļ				e with requirements - MTCD System	4
Ļ			Lack of adherence of airlines to de		1
Ļ				conflict before it reach the tactical controller	1
L				orne operation in terms of minimum seprataion	I
L			Incorrect use of communication e		I
L			Military activity in controlled airpo	ort or located within controlled area	Ι
I			General aviation activity in control	lled airport or located within controlled area	Ι
Γ			Intensified traffic related to general	al aviation activity e. g. over GA airport / airfield	Т
Γ			Deviation from flight trajectory co		Ť
T				nce process definition - FMS subsystems and	T
ı		1	components (autopilot incl.)	•	ı
t				nce process definition - Onboard navigational	Ť
l			systems and components		ı
r					Ť
ŀ				trol process - Fire extinguishing system components trol process - Onboard navigational systems and	1
l			components.	roi process - Oriboard Havigational systems and	١
t			Traffic controller tiredness - Inade	quate workload distribution	t
t				ents definition process and/or training	Ť
ĺ			methodology	,	ı
t			Flaws in Airspace and Air Traffic pl.	anning procedures design process	†
H		 		echnology standards in terms of flight safety	+
ı		I			1
ł		-	supporting systems. Lack of STCA S		+
ļ				oncerning independent ATCO monitoring	4
Т				nd / or flaws in methodology concerning verification	n
1			of the system / product complianc		



		Base events	Code	Definition	Identifiable precursors	No
ESC		Base events	Code	Definition	Identifiable precursors	No.
ı		Unstable Approach			Unstable Approach	
				An input to the aircraft's flight controls by flight crew results in the approach becoming destabilised, such as high sink rate, deviate above or below the glide slope, speed too fast/ slow, or aircraft not		
	1	Poor manual flight control causes UA	AL19B111	aligned with the centre line to the runway	Lack of adherence to SOP in terms of approach and landing	24
					Pilot tiredness - Inadequate workload distribution	16
					Flaws in pilot requirements definition process and/or training methodology	16
				Flight crew fail to conduct briefings and checklists, which leads to a	Lack of adherence to SOP in terms of briefing and checklist before initiating of	
	2	Check list failure	AL19B1121	CRM failure	approach and landing	24
_					Pilot tiredness - Inadequate workload distribution	16
_					Flaws in pilot requirements definition process and/or training methodology	16
	2	Improper control exchange	AL19B1122	An exchange of control of the aircraft occurs at an inappropriate time during the approach or following an exchange of control, the flight crew are unsure of their roles	Lack of adherence to SOP in terms of approach and landing	24
		improper control exchange	ALISBITEE	ingite crew are unsure of their roles	Pilot tiredness - Inadequate workload distribution	16
					Flaws in pilot requirements definition process and/or training methodology	16
					Flaws in CRM training procedures	26
					Lack of adherence to the main CRM rules	26
		Poor automated systems management		Flight crew use the flight management system inappropriately. Flight management system includes the Autopilot and auto throttle		
_	4	causes UA	AL19B113	systems among others	Incorrect use of automation - FMS	26
					Pilot tiredness - Inadequate workload distribution	16
_					Flaws in pilot requirements definition process and/or training methodology	16
					Unintuitive and / or error prone system manual - FMS	49
		lf. dayal	A1405434	Flight crew losses visual reference with the runway when not on an	Lack of adherence to the current technology standards in terms of flight safety	-
\vdash	5	Loss of visual	AL19B121	ILS approach	supporting systems. Lack of ILS on descent path	24
\vdash	_		-	Turbulance is so source that an anatomic at 19 at 19 at	Adverse weather / poor visibility conditions / darkness	⊢
	_	Savara turbulansa	AL100133	Turbulence is so severe that no control input will stabilise the	Convective weather / turbulance / windsher	1.
	ь	Severe turbulence	AL19B122	approach	Convective weather / turbulence / windshear or crosswind conditions during take-off	3
					Lack of adherence to SARPs included in Annex 14 and related documents in terms of	34
	-		 	Crosswind component for the aircraft is exceeded and it becomes	temporary suspension of operation on airport inthe case of adverse weather.	24
	7	Crosswind exceeded	AL19B123	unsafe for the aircraft to land	Convective weather / turbulence / windshear or crosswind conditions during take-off	3
		e. osawina exceeueu	, 1270123	ansare for the diretart to fallu	Lack of adherence to SARPs included in Annex 14 and related documents in terms of	3
					temporary suspension of operation on airport inthe case of adverse weather.	24
					Lack of adherence to SARPs included in Annex 14 and related documents in terms of	-
					RWY parameters and location, approach path parameters and obstacles locations.	29
		Flight crew fails to initiate and execute			, , , , , , , , , , , , , , , , , , ,	Г
П		missed approach			Flight crew fails to initiate and execute missed approach	
		Flight crew fail to recognise unstable		Both pilot and co-pilot fail to recognise the symptoms of an		Т
		approach	AL19B211	unstable approach and hence a missed approach is not initiated	Pilot tiredness - Inadequate workload distribution	16
					Flaws in pilot requirements definition process and/or training methodology	16
					Adverse weather / poor visibility conditions / darkness	
Т						Т
					Convective weather / turbulence / windshear or crosswind conditions during take-off	3
					Lack of adherence to SOP in terms of approach and landing	24
					Pilot tiredness - Inadequate workload distribution	16
					Flaws in pilot requirements definition process and/or training methodology	16
					Lack of adherence to SOP in terms of briefing and checklist before initiating of	
					approach and landing	24
					Flaws in CRM training procedures	26
					Lack of adherence to the main CRM rules	26
					Incorrect use of automation - FMS	26
					Lack of adherence to the current technology standards in terms of flight safety	١.,
	_				supporting systems. Lack of ILS on descent path	24
					Lack of adherence to SARPs included in Annex 14 and related documents in terms of	١.,
	-		 		temporary suspension of operation on airport in the case of adverse weather.	24
			I		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.	29
	\rightarrow		 		Unintuitive and / or error prone system manual - FMS	49
		Crew fail to respond appropriately to	<u> </u>	Flight crew recognise the unstable approach but are not able to	2 2 y or error prone system mandar 11113	13
		unstable approach	AL19B212	take appropriate action to initiate a missed approach	Flaws in pilot requirements definition process and/or training methodology	16
	-	A SAME SAS			Pilot tiredness - Inadequate workload distribution	16
					Adverse weather / poor visibility conditions / darkness	1
						Т
			<u> </u>		Convective weather / turbulence / windshear or crosswind conditions during take-off	3
			_		Lack of adherence to SOP in terms of approach and landing	24
					Pilot tiredness - Inadequate workload distribution	16
					Flaws in pilot requirements definition process and/or training methodology	
					Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of	16
					Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing	16 24
					Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures	24 26
					Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules	24 26 26
					Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS	24 26
					Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety	24 26 26 26
					Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path	24 26 26
					Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of	24 26 26 26 24
					Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather.	24 26 26 26
					Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of	24 26 26 26 24 24
					Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LS on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.	24 26 26 26 24 24
				After initiating a missed approach, the AOA protection system	Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of	24 26 26 26 24 24
				activates and prevents the flight crew from executing the missed	Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LS on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.	24 26 26 26 24 24
				activates and prevents the flight crew from executing the missed approach. AOA prevention system activates when the nose of the	Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS	24 26 26 26 24 24
			ALONG STATE OF THE	activates and prevents the flight crew from executing the missed approach. AOA prevention system activates when the nose of the aircraft is pulled up sharply and is designed to prevent the aircraft	Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Lack of adherence to AIR OPS normal procedures in terms of missed approach	24 26 26 26 24 24 29
	10	AOA protection prevents MA	AL198221	activates and prevents the flight crew from executing the missed approach. AOA prevention system activates when the nose of the	Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure	24 26 26 26 24 24 29 49
	10	AOA protection prevents MA	AL198221	activates and prevents the flight crew from executing the missed approach. AOA prevention system activates when the nose of the aircraft is pulled up sharply and is designed to prevent the aircraft	Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure Pilot tiredness - inadequate workload distribution	24 26 26 26 24 24 29 49
	10	AOA protection prevents MA	AL198221	activates and prevents the flight crew from executing the missed approach. AOA prevention system activates when the nose of the aircraft is pulled up sharply and is designed to prevent the aircraft	Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure	24 26 26 26 24 24 29 49



6						
_						
_					Convective weather / turbulence / windshear or crosswind conditions during take-off	
					Lack of adherence to SOP in terms of approach and landing	245
8					Pilot tiredness - Inadequate workload distribution	167
9					Flaws in pilot requirements definition process and/or training methodology	168
					Lack of adherence to SOP in terms of briefing and checklist before initiating of	'
10					approach and landing	246
11					Flaws in CRM training procedures	263
12					Lack of adherence to the main CRM rules	264
13					Incorrect use of automation - FMS	269
					Lack of adherence to the current technology standards in terms of flight safety	'
14					supporting systems. Lack of ILS on descent path	248
					Lack of adherence to SARPs included in Annex 14 and related documents in terms of	'
15					temporary suspension of operation on airport inthe case of adverse weather.	249
					Lack of adherence to SARPs included in Annex 14 and related documents in terms of	'
16					RWY parameters and location, approach path parameters and obstacles locations.	295
17					Unintuitive and / or error prone system manual - FMS	494
				Flight crew initiate a missed approach but fail to take appropriate	Lack of adherence to AIR OPS normal procedures in terms of missed approach	'
1	11	PF fails to execute correctly	AL19B222	action to execute the missed approach	execution procedure	250
2					Pilot tiredness - Inadequate workload distribution	167
3					Flaws in pilot requirements definition process and/or training methodology	168
4					Adverse weather / poor visibility conditions / darkness	6
ا ا						
5					Convective weather / turbulence / windshear or crosswind conditions during take-off	
6					Lack of adherence to SOP in terms of approach and landing	245
7			+	<u> </u>	Pilot tiredness - Inadequate workload distribution	167
8			+	<u> </u>	Flaws in pilot requirements definition process and/or training methodology	168
اہا			1		Lack of adherence to SOP in terms of briefing and checklist before initiating of	1
9			+	<u> </u>	approach and landing	246
10			+		Flaws in CRM training procedures	263
11			+	<u> </u>	Lack of adherence to the main CRM rules	264
12			+		Incorrect use of automation - FMS	269
			T		Lack of adherence to the current technology standards in terms of flight safety	1
13			+		supporting systems. Lack of ILS on descent path	248
إرا			T		Lack of adherence to SARPs included in Annex 14 and related documents in terms of	
14			+		temporary suspension of operation on airport inthe case of adverse weather.	249
ا ِ ا			T		Lack of adherence to SARPs included in Annex 14 and related documents in terms of	
15			+		RWY parameters and location, approach path parameters and obstacles locations.	295
16					Unintuitive and / or error prone system manual - FMS	494
						'
Ш						'
+ 11						'
+1	Ш	Flight crew fails to maintain control			Flight crew fails to maintain control	<u> </u>
						'
				No input to controls will allow the flight crew to maintain control of		'
1	12	Uncontrollable	AL19B31	the aircraft after failing to initiate or execute a missed approach	not identifiable at the moment	\perp
2					Adverse weather / poor visibility conditions / darkness	6
						'
3					Convective weather / turbulence / windshear or crosswind conditions during take-off	
4					Lack of adherence to SOP in terms of approach and landing	245
5					Pilot tiredness - Inadequate workload distribution	167
6					Flaws in pilot requirements definition process and/or training methodology	168
					Lack of adherence to SOP in terms of briefing and checklist before initiating of	'
7					approach and landing	246
8					Flaws in CRM training procedures	263
9					Lack of adherence to the main CRM rules	264
10					Incorrect use of automation - FMS	269
					Lack of adherence to the current technology standards in terms of flight safety	'
11					supporting systems. Lack of ILS on descent path	248
			+		Lack of adherence to SARPs included in Annex 14 and related documents in terms of	
اررا						
12					temporary suspension of operation on airport inthe case of adverse weather.	249
П					Lack of adherence to SARPs included in Annex 14 and related documents in terms of	
13					Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.	295
13 14					Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS	295 494
13 14 15					Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution	295 494 167
13 14					Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	295 494
13 14 15 16					Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to AIR OPS normal procedures in terms of missed approach	295 494 167 168
13 14 15 16					Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure	295 494 167 168 250
13 14 15 16					Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to AIR OPS normal procedures in terms of missed approach	295 494 167 168
13 14 15 16 17 18				The pilot makes no attempt to control the aircraft after failing to	Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure Aggressive maneuvering / overcontrolling	295 494 167 168 250 182
13 14 15 16	13	Lack of control	AL19832	The pilot makes no attempt to control the aircraft after failing to initiate or execute a missed approach	Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure Aggressive maneuvering / overcontrolling Lack of adherence to emergency procedures	295 494 167 168 250 182 448
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13 14 15 16 17 18 1 2 3 4 5 6 7 8 9 10 11 12	13	Lack of control	AL19B32		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure Aggressive maneuvering / overcontrolling Lack of adherence to emergency procedures Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of priefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LS on descent path	295 494 167 168 250 182 448 151 167 168 32 245 167 168 246 2263 2264
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13 14 15 16 17 18 1 2 3 4 5 6 7 7 8 9 10 11 12 13 14 15 16 17 17 18	13	Lack of control	AL19832		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure Aggressive maneuvering / overcontrolling Lack of adherence to emergency procedures Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of priefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RW parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS	295 494 167 168 250 182 448 151 167 168 6 32 245 167 168 246 226 248 229 248 249
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				The pilot applies incorrect control to the aircraft, after failing to		
				initiate or execute a missed approach. This can be due to improper		
	14	Incorrect Control	AL19B33	training, stress and fatigue	Lack of adherence to emergency procedures	448
2					Pilot tiredness - Inadequate workload distribution	167
3					Flaws in pilot requirements definition process and/or training methodology	168
4					Adverse weather / poor visibility conditions / darkness	6
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					Lack of adherence to AIR OPS normal procedures in terms of missed approach	
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30					Aggressive maneuvering / overcontrolling	182
31					Lack of adherence to emergency procedures	448
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7		 	+		Late deceleration and configuration set-up for approach and landing	414
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9					Unstabilized final approach (high, fast, steep,)	416
10					Adverse weather / poor visibility conditions / darkness	6
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36 37 38 4 5 6 7 8 9 10 11 12 13 14 15 16	200	Incorrect Control	AL19B53	structural failure caused by hard landing. This can be due to	Flaws in manufacturer quality control process - Landing gear components. Lack of adherence to AFM limitations for landing Lack of adherence to emergency procedures Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	377 376 251 448 166 168 244 167 168 246 262 262 248 249 249 249 249 249 249 249
36 37 38 1 2 3 4 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18	20	Incorrect Control	AL19853	structural failure caused by hard landing. This can be due to	Flaws in manufacturer quality control process - Landing gear components. Lack of adherence to AFM limitations for landing Lack of adherence to emergency procedures Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLS on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RMV parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Pilot triedness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to AIR OPS normal procedures in terms of missed approach	377 376 251 448 466 168 246 265 266 266 248 249 249 166 168
36 37 38 1 2 3 4 4 5 6 7 8 9 9 10 11 11 12 13 14 15 16 17 18	200	Incorrect Control	AL19853	structural failure caused by hard landing. This can be due to	Flaws in manufacturer quality control process - Landing gear components. Lack of adherence to AFM limitations for landing Lack of adherence to emergency procedures Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to taken sincluded in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure	3777 3762 251 1686 6 2482 2482 2492 2494 2494 2494 2494 2494
36 37 38 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	20	Incorrect Control	AL19B53	structural failure caused by hard landing. This can be due to	Flaws in manufacturer quality control process - Landing gear components. Lack of adherence to AFM limitations for landing Lack of adherence to emergency procedures Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWV parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure	377 376 251 448 167 168 249 167 246 266 266 248 249 494 167 168 250 182
36 37 38 1 2 3 4 5 6 6 7 8 8 9 10 11 12 13 14 15 16 17 18	20	Incorrect Control	AL19B53	structural failure caused by hard landing. This can be due to	Flaws in manufacturer quality control process - Landing gear components. Lack of adherence to AFM limitations for landing Lack of adherence to emergency procedures Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLS on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RMV parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure Aggressive maneuvering / overcontrolling Lack of adherence to AIR ops normal procedures in terms of missed approach execution procedure	3777 376 251 168 6 322 45 167 168 246 263 264 265 249 494 167 168 249 249 494 494 494 494 494 494 494 494
36 37 38 4 5 6 7 8 9 9 10 11 11 12 13 14 15 16 17 18 19 20 21	20	Incorrect Control	AL19853	structural failure caused by hard landing. This can be due to	Flaws in manufacturer quality control process - Landing gear components. Lack of adherence to AFM limitations for landing Lack of adherence to emergency procedures Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure Aggressive maneuvering / overcontrolling Lack of adherence to emergency procedures Lack of adherence to emergency procedures Lack of adherence to emergency procedures	377 377 251 168 6 248 248 248 249 249 249 249 494 494 494 494 494 494
36 37 38 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21	20	Incorrect Control	AL19B53	structural failure caused by hard landing. This can be due to	Flaws in manufacturer quality control process - Landing gear components. Lack of adherence to AFM limitations for landing Lack of adherence to emergency procedures Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LS on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure Aggressive maneuvering / overcontrolling Lack of adherence to temergency procedures Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	377 377 251 168 6 248 167 168 248 249 249 249 499 168 168 248 249 494 494 494 168 168 168 168 168 168 168 168 168 168
36 37 38 4 5 6 7 8 9 9 10 11 11 12 13 14 15 16 17 18 19 20 21	20	Incorrect Control	AL19B53	structural failure caused by hard landing. This can be due to	Flaws in manufacturer quality control process - Landing gear components. Lack of adherence to AFM limitations for landing Lack of adherence to emergency procedures Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure Aggressive maneuvering / overcontrolling Lack of adherence to emergency procedures Lack of adherence to emergency procedures Lack of adherence to emergency procedures	377 376 251 168 322 448 246 263 264 265 248 249 494 167 168



2-1	-			precursors and CATS base Events		1 2 2 2 1
26					Bounced landing	118
27 28			 		Deep (long) landing Descent above desired descent profile	119 412
-0					High energy approach due to lack of adequate planning or due to challenging design	.12
					of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent,	
29					vectors, altitude or speed restrictions,)	413
30					Late deceleration and configuration set-up for approach and landing	414
31 32					DME / ILS DME confusion in assessing the final descent point / FAF Unstabilized final approach (high, fast, steep,)	415 416
32					onstabilized fillal approach (filgh, fast, steep,)	410
					Inadequate certification process and / or flaws in methodology concerning verification	
33					of the system / product compliance with requirements - Landing gear components	358
П					Flaws in maintenance technician / airworthiness specialist requirements definition	
34					process and/or training methodology	149
					Maintenance technician / airworthiness specialist tiredness - Inadequate workload	
35 36					distribution Flaws in aircraft system maintenance process definition - Landing gear components.	150 377
37					Flaws in manufacturer quality control process - Landing gear components.	376
38					Lack of adherence to AFM limitations for landing	251
				The pilot applies correct measures after aircraft suffering structural		
				failure caused by hard landing, but these are not enough to prevent		
1	21	Insufficient control	AL19B54	aircraft leaving off the side of the runway	Pilot tiredness - Inadequate workload distribution	167
2					Flaws in pilot requirements definition process and/or training methodology	168
3					Adverse weather / poor visibility conditions / darkness	6
4					Convective weather / turbulence / windshear or crosswind conditions during take-off	32
5			 		Lack of adherence to SOP in terms of approach and landing	245
6					Pilot tiredness - Inadequate workload distribution	167
7					Flaws in pilot requirements definition process and/or training methodology	168
П					Lack of adherence to SOP in terms of briefing and checklist before initiating of	
8					approach and landing	246
9					Flaws in CRM training procedures	263
10			 		Lack of adherence to the main CRM rules	264
11			 		Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety	269
12			1		supporting systems. Lack of ILS on descent path	248
					Lack of adherence to SARPs included in Annex 14 and related documents in terms of	2,70
13	_		<u> </u>		temporary suspension of operation on airport inthe case of adverse weather.	249
					Lack of adherence to SARPs included in Annex 14 and related documents in terms of	
14					RWY parameters and location, approach path parameters and obstacles locations.	295
15					Unintuitive and / or error prone system manual - FMS	494
16					Pilot tiredness - Inadequate workload distribution	167
17					Flaws in pilot requirements definition process and/or training methodology	168
18					Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure	250
19					Aggressive maneuvering / overcontrolling	182
20					Lack of adherence to emergency procedures	448
П					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	
21					or / and passive contribution to the PF duties	151
22					Pilot tiredness - Inadequate workload distribution	167
23					Flaws in pilot requirements definition process and/or training methodology	168
24 25			 		Hard landing Bounced landing	47 118
26			 		Deep (long) landing	118
27			 		Descent above desired descent profile	412
Ħ					High energy approach due to lack of adequate planning or due to challenging design	
			1		of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent,	
28					vectors, altitude or speed restrictions,)	413
29			 		Late deceleration and configuration set-up for approach and landing	414
30 31			 		DME / ILS DME confusion in assessing the final descent point / FAF Unstabilized final approach (high, fast, steep,)	415 416
21			 		onstabilized illiai approacti (tilgii, tast, steet),)	410
			1		Inadequate certification process and / or flaws in methodology concerning verification	
32			1		of the system / product compliance with requirements - Landing gear components	358
					Flaws in maintenance technician / airworthiness specialist requirements definition	
33					process and/or training methodology	149
			Ι		Maintenance technician / airworthiness specialist tiredness - Inadequate workload	[_]
34			-		distribution	150
35 36			 		Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components.	377 376
37			 		Lack of adherence to AFM limitations for landing	251
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VI						
+1						
+ 11						
† 	,	Failure to achieve maries 1			Failure to achieve maximum hyplin -	
III \	/1	Failure to achieve maximum braking	 	Runway can be too short under wet or icy runway conditions for	Failure to achieve maximum braking	\vdash
Н				plane to stop even if touchdown is successful and brakes are	Adverse weather in terms of heavy rain or icing conditions resulted with decreased	
1 I			1			45
1	22	Insufficient runway length	AL19B61	applied and functioning.	RWY surface friction rate	
2	22	Insufficient runway length	AL19B61	applied and functioning.	Pilot tiredness - Inadequate workload distribution	167
	22	Insufficient runway length	AL19B61	applied and functioning.	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	
2	22	Insufficient runway length	AL19B61	applied and functioning.	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of	167
3	22	Insufficient runway length	AL19B61	applied and functioning.	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below	167 168
3	22	Insufficient runway length	AL19B61	appiled and functioning.	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum	167 168 203
3	22	Insufficient runway length	AL19B61	appined and functioning.	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below	167 168
3	22	Insufficient runway length	AL19B61	applied and functioning.	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum Adverse weather / poor visibility conditions / darkness	167 168 203 6
2 3 5 6	22	Insufficient runway length	AL19B61	applied and functioning.	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off	167 168 203 6
2 3 5 6	22	Insufficient runway length	AL19B61	appined and functioning.	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum Adverse weather / poor visibility conditions / darkness	167 168 203 6
2 3 5 6	22	Insufficient runway length	AL19861	appined and functioning.	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing	167 168 203 6 32 245
2 3 5 6 7 8	22	Insufficient runway length	AL19861	applied and functioning.	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution	167 168 203 6 32 245 167 168
2 3 5 6 7 8 9 10	22	Insufficient runway length	AL19861	appiled and functioning.	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum Adverse weather / poor visibility conditions / darkness Convective weather / trubulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing	167 168 203 6 32 245 167 168
2 3 5 6 7 8 9 10	22	Insufficient runway length	AL19861	appied and functioning.	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures	167 168 203 6 32 245 167 168 246 263
2 3 3 5 6 6 7 7 8 9 10 11 12 13	22	Insufficient runway length	AL19861	applied and functioning.	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules	203 6 32 245 167 168 246 263 264
2 3 5 6 7 8 9 10 11 12	22	Insufficient runway length	AL19861	applied and functioning.	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures	167 168 203 6 32 245 167 168 246 263



16						
16					Lack of adherence to SARPs included in Annex 14 and related documents in terms of	
					temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of	249
17					RWY parameters and location, approach path parameters and obstacles locations.	295
18					Unintuitive and / or error prone system manual - FMS	494
19					Pilot tiredness - Inadequate workload distribution	167
20					Flaws in pilot requirements definition process and/or training methodology	168
21					Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure	250
22					Aggressive maneuvering / overcontrolling	182
23					Lack of adherence to emergency procedures	448
П					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	
24					or / and passive contribution to the PF duties	151
25 26					Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168
20				Brakes are not giving maximum braking, i.e. because of improper	riaws in pilot requirements definition process and/or training methodology	100
1	23	Brakes not functioning correctly	AL19B62	maintenance and damages	Hard landing	47
					System failures that may affect braking devices (ground spoilers, brakes / autobrake,	
2					thrust reversers)	15
					Severe structural failure of aircraft or / and its critical systems resulted from design	
3					load exceeding during touchdown Flaws in maintenance technician / airworthiness specialist requirements definition	49
4					process and/or training methodology	149
H					Maintenance technician / airworthiness specialist tiredness - Inadequate workload	
5					distribution	150
6					Adverse weather / poor visibility conditions / darkness	6
8					Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing	32 245
9					Pilot tiredness - Inadequate workload distribution	167
10				<u> </u>	Flaws in pilot requirements definition process and/or training methodology	168
					Lack of adherence to SOP in terms of briefing and checklist before initiating of	
11				1	approach and landing	246
12			+	<u> </u>	Flaws in CRM training procedures	263
13 14			+		Lack of adherence to the main CRM rules Incorrect use of automation - FMS	264 269
14			+		Lack of adherence to the current technology standards in terms of flight safety	209
15					supporting systems. Lack of ILS on descent path	248
\Box					Lack of adherence to SARPs included in Annex 14 and related documents in terms of	
16					temporary suspension of operation on airport inthe case of adverse weather.	249
					Lack of adherence to SARPs included in Annex 14 and related documents in terms of	
17 18					RWY parameters and location, approach path parameters and obstacles locations.	295 494
19				+	Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution	167
20					Flaws in pilot requirements definition process and/or training methodology	168
					Lack of adherence to AIR OPS normal procedures in terms of missed approach	
21					execution procedure	250
22					Aggressive maneuvering / overcontrolling	182
23					Lack of adherence to emergency procedures	448
24					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
25					Pilot tiredness - Inadequate workload distribution	167
26			-		Flaws in pilot requirements definition process and/or training methodology	168
\Box						
				Flight crew's failure to arm spoilers during the approach or apply on touchdown, failure in CRM leading to brakes not being applied,		
1	24	Brakes not applied correctly	Al 19863	touchdown, failure in CRM leading to brakes not being applied, failure to apply brakes soon after touchdown, disengaging brakes	Failure to arm ground-spoilers	
1 2	24	Brakes not applied correctly	AL19B63	touchdown, failure in CRM leading to brakes not being applied,	Failure to arm ground-spoilers Inappropriate selection of autobrake mode for given runway length and condition	177 178
	24	Brakes not applied correctly	AL19B63	touchdown, failure in CRM leading to brakes not being applied, failure to apply brakes soon after touchdown, disengaging brakes	Inappropriate selection of autobrake mode for given runway length and condition Late thrust reduction or power-on touchdown	177 178 176
2	24	Brakes not applied correctly	AL19B63	touchdown, failure in CRM leading to brakes not being applied, failure to apply brakes soon after touchdown, disengaging brakes	Inappropriate selection of autobrake mode for given runway length and condition Late thrust reduction or power-on touchdown Delayed selection of reverse thrust	177 178 176 175
3	24	Brakes not applied correctly	AL19B63	touchdown, failure in CRM leading to brakes not being applied, failure to apply brakes soon after touchdown, disengaging brakes	Inappropriate selection of autobrake mode for given runway length and condition Late thrust reduction or power-on touchdown Delayed selection of reverse thrust Late activation of pedal braking or takeover from autobrake, when so required	177 178 176 175 174
3	24	Brakes not applied correctly	AL19B63	touchdown, failure in CRM leading to brakes not being applied, failure to apply brakes soon after touchdown, disengaging brakes	Inappropriate selection of autobrake mode for given runway length and condition Late thrust reduction or power-on touchdown Delayed selection of reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Pilot tiredness - inadequate workload distribution	177 178 176 175 174 167
2 3 4 5 6 7	24	Brakes not applied correctly	AL19B63	touchdown, failure in CRM leading to brakes not being applied, failure to apply brakes soon after touchdown, disengaging brakes	inappropriate selection of autobrake mode for given runway length and condition Late thrust reduction or power-on touchdown Delayed selection of reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	177 178 176 175 174 167 168
3	24	Brakes not applied correctly	AL19B63	touchdown, failure in CRM leading to brakes not being applied, failure to apply brakes soon after touchdown, disengaging brakes	Inappropriate selection of autobrake mode for given runway length and condition Late thrust reduction or power-on touchdown Delayed selection of reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Pilot tiredness - inadequate workload distribution	177 178 176 175 174 167
2 3 4 5 6 7 8 9	24	Brakes not applied correctly	AL19B63	touchdown, failure in CRM leading to brakes not being applied, failure to apply brakes soon after touchdown, disengaging brakes	Inappropriate selection of autobrake mode for given runway length and condition Late thrust reduction or power-on touchdown Delayed selection of reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing	177 178 176 175 174 167 168 245
2 3 4 5 6 7 8	24	Brakes not applied correctly	AL19B63	touchdown, failure in CRM leading to brakes not being applied, failure to apply brakes soon after touchdown, disengaging brakes	Inappropriate selection of autobrake mode for given runway length and condition Late thrust reduction or power-on touchdown Delayed selection of reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures	177 178 176 175 174 167 168 245 263
2 3 4 5 6 7 8 9 10	24	Brakes not applied correctly	AL19B63	touchdown, failure in CRM leading to brakes not being applied, failure to apply brakes soon after touchdown, disengaging brakes	Inappropriate selection of autobrake mode for given runway length and condition Late thrust reduction or power-on touchdown Delayed selection of reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Adverse weather / poor visibility conditions / darkness	177 178 176 175 174 167 168 245 263 264 6
2 3 4 5 6 7 8 9 10 11	24	Brakes not applied correctly	AL19B63	touchdown, failure in CRM leading to brakes not being applied, failure to apply brakes soon after touchdown, disengaging brakes	Inappropriate selection of autobrake mode for given runway length and condition Late thrust reduction or power-on touchdown Delayed selection of reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off	177 178 176 175 174 167 168 245 263 264 6
2 3 4 5 6 7 8 9 10 11	24	Brakes not applied correctly	AL19B63	touchdown, failure in CRM leading to brakes not being applied, failure to apply brakes soon after touchdown, disengaging brakes	Inappropriate selection of autobrake mode for given runway length and condition Late thrust reduction or power-on touchdown Delayed selection of reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Adverse weather / poor visibility conditions / darkness	177 178 176 175 174 167 168 245 263 264 6
2 3 4 5 6 7 8 9 10 11	24	Brakes not applied correctly	AL19B63	touchdown, failure in CRM leading to brakes not being applied, failure to apply brakes soon after touchdown, disengaging brakes	Inappropriate selection of autobrake mode for given runway length and condition Late thrust reduction or power-on touchdown Delayed selection of reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in ICRM training procedures Lack of adherence to the main CRM rules Adverse weather / poor visibility conditions / darkness Convective weather / trubulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing	177 178 176 175 174 167 168 245 263 264 6
2 3 4 5 6 7 8 9 10 11 12 13 14 15	24	Brakes not applied correctly	AL19B63	touchdown, failure in CRM leading to brakes not being applied, failure to apply brakes soon after touchdown, disengaging brakes	Inappropriate selection of autobrake mode for given runway length and condition Late thrust reduction or power-on touchdown Delayed selection of reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of	177 178 176 175 174 167 168 245 264 6 32 245 167 168
2 3 4 5 6 7 8 9 10 11 12 13 14 15	24	Brakes not applied correctly	AL19B63	touchdown, failure in CRM leading to brakes not being applied, failure to apply brakes soon after touchdown, disengaging brakes	Inappropriate selection of autobrake mode for given runway length and condition Late thrust reduction or power-on touchdown Delayed selection of reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing	177 178 176 175 174 167 168 245 263 264 6 32 245 167 168
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	24	Brakes not applied correctly	AL19B63	touchdown, failure in CRM leading to brakes not being applied, failure to apply brakes soon after touchdown, disengaging brakes	Inappropriate selection of autobrake mode for given runway length and condition Late thrust reduction or power-on touchdown Delayed selection of reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures	1777 178 176 176 1774 1677 168 245 263 264 6 32 245 167 168 245
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17	24	Brakes not applied correctly	AL19B63	touchdown, failure in CRM leading to brakes not being applied, failure to apply brakes soon after touchdown, disengaging brakes	Inappropriate selection of autobrake mode for given runway length and condition Late thrust reduction or power-on touchdown Delayed selection of reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules	177 178 176 175 174 167 168 245 264 6 32 245 167 168 246 263 264 263 264
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	24	Brakes not applied correctly	AL19B63	touchdown, failure in CRM leading to brakes not being applied, failure to apply brakes soon after touchdown, disengaging brakes	Inappropriate selection of autobrake mode for given runway length and condition Late thrust reduction or power-on touchdown Delayed selection of reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of priefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to SOP in terms of priefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS	1777 178 176 176 1774 1677 168 245 263 264 6 32 245 167 168 245
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17	24	Brakes not applied correctly	AL19B63	touchdown, failure in CRM leading to brakes not being applied, failure to apply brakes soon after touchdown, disengaging brakes	Inappropriate selection of autobrake mode for given runway length and condition Late thrust reduction or power-on touchdown Delayed selection of reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules	177 178 176 175 174 167 168 245 264 6 32 245 167 168 246 263 264 263 264
2 3 4 4 5 6 6 7 8 8 9 10 111 12 13 14 15 16 17 18 19 20	24	Brakes not applied correctly	AL19B63	touchdown, failure in CRM leading to brakes not being applied, failure to apply brakes soon after touchdown, disengaging brakes	Inappropriate selection of autobrake mode for given runway length and condition Late thrust reduction or power-on touchdown Delayed selection of reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LIS on descent path Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of IS on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of	177 178 176 175 174 167 168 245 263 264 6 32 245 167 168 246 263 264 263 264 263 264 263 264 265 264 265 266 266 266 267 268 268 268 268 268 268 268 268 268 268
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2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	24	Brakes not applied correctly	AL19B63	touchdown, failure in CRM leading to brakes not being applied, failure to apply brakes soon after touchdown, disengaging brakes	Inappropriate selection of autobrake mode for given runway length and condition Late thrust reduction or power-on touchdown Delayed selection of reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Pilot tiredness - Inadequate workload distribution Filaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Filaws in ICRM training procedures Lack of adherence to the main CRM rules Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Filaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Filaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of	1777 1788 1766 1755 1674 1688 2445 2633 2245 1677 1688 2466 2464 2464 2694 2488
2 3 4 4 5 6 7 8 8 9 10 11 12 13 14 15 16 17 18 19 20 21	24	Brakes not applied correctly	AL19B63	touchdown, failure in CRM leading to brakes not being applied, failure to apply brakes soon after touchdown, disengaging brakes	Inappropriate selection of autobrake mode for given runway length and condition Late thrust reduction or power-on touchdown Delayed selection of reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Adverse weather / torbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of paproach and landing Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of IL Son descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.	1777 178 176 175 167 168 245 263 264 6 32 245 167 168 246 263 264 269 248
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	24	Brakes not applied correctly	AL19B63	touchdown, failure in CRM leading to brakes not being applied, failure to apply brakes soon after touchdown, disengaging brakes	Inappropriate selection of autobrake mode for given runway length and condition Late thrust reduction or power-on touchdown Delayed selection of reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Pilot tiredness - Inadequate workload distribution Filaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Filaws in ICRM training procedures Lack of adherence to the main CRM rules Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Filaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Filaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of	1777 1788 1766 1755 1674 1688 2445 2633 2245 1677 1688 2466 2464 2464 2694 2488
2 3 4 4 5 6 7 8 8 9 10 11 1 12 13 14 15 16 17 18 19 20 21 22 23	24	Brakes not applied correctly	AL19B63	touchdown, failure in CRM leading to brakes not being applied, failure to apply brakes soon after touchdown, disengaging brakes	Inappropriate selection of autobrake mode for given runway length and condition Late thrust reduction or power-on touchdown Delayed selection of reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of priefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Unintuitive and / or error prone system manual - FMS	1777 178 176 175 168 245 263 264 6 32 245 167 168 2246 2246 246 2246 246 246 246 246 246
2 3 4 5 6 7 7 8 9 9 100 111 11 12 13 13 14 15 16 17 18 19 20 21 22 23 24 25 5	24	Brakes not applied correctly	AL19B63	touchdown, failure in CRM leading to brakes not being applied, failure to apply brakes soon after touchdown, disengaging brakes	Inappropriate selection of autobrake mode for given runway length and condition Late thrust reduction or power-on touchdown Delayed selection of reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of paproach and landing Flaws in in CRM training procedures Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of il.S on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation, approach path parameters and locations. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process sand/or training methodology Lack of adherence to AIR OPS normal procedures in terms of missed approach	1777 1788 1766 1755 1744 1677 1688 2643 2644 6 32 2455 1677 1688 2644 2699 248 249 249 249
2 3 4 5 6 6 7 7 8 8 9 100 111 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26	24	Brakes not applied correctly	AL19B63	touchdown, failure in CRM leading to brakes not being applied, failure to apply brakes soon after touchdown, disengaging brakes	Inappropriate selection of autobrake mode for given runway length and condition Late thrust reduction or power-on touchdown Delayed selection of reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in ICRM training procedures Lack of adherence to the main CRM rules Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flack of adherence to AR OPS normal procedures in terms of missed approach execution procedure	177 178 176 176 176 177 168 245 263 2245 167 168 246 263 2245 248 249 248 249 249 249 250
2 3 4 5 6 7 7 8 8 9 10 11 1 12 13 14 15 17 18 19 20 21 22 23 24 25 26 27	24	Brakes not applied correctly	AL19B63	touchdown, failure in CRM leading to brakes not being applied, failure to apply brakes soon after touchdown, disengaging brakes	Inappropriate selection of autobrake mode for given runway length and condition Late thrust reduction or power-on touchdown Delayed selection of reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Adverse weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of profing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure Aggressive maneuvering / overcontrolling	1777 1788 1766 175 174 1688 245 263 264 6 2245 167 1688 246 269 248 249 295 494 497 1688 250 182
2 3 4 5 6 7 7 8 8 9 100 111 112 133 144 155 166 177 18 19 20 21 22 23 24 25 26	24	Brakes not applied correctly	AL19B63	touchdown, failure in CRM leading to brakes not being applied, failure to apply brakes soon after touchdown, disengaging brakes	Inappropriate selection of autobrake mode for given runway length and condition Late thrust reduction or power-on touchdown Delayed selection of reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Pilot tiredness - inadequate workload distribution Filaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Filaws in CRM training procedures Lack of adherence to the main CRM rules Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Filaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Filaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to ARP Sor normal procedures in terms of missed approach execution procedure Lack of adherence to ARP Por prone system manual - FMS Flot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to ARP Por prone system manual - FMS	177 178 176 175 174 167 168 245 263 2245 167 168 246 263 2245 246 248 249 249 249 249
2 3 4 5 6 7 8 9 10 11 1 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 8	24	Brakes not applied correctly	AL19B63	touchdown, failure in CRM leading to brakes not being applied, failure to apply brakes soon after touchdown, disengaging brakes	Inappropriate selection of autobrake mode for given runway length and condition Late thrust reduction or power-on touchdown Delayed selection of reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in ic RBM training procedures Lack of adherence to the main CRM rules Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of remporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to ARI OPS normal procedures in terms of missed approach execution procedure Lack of adherence to emergency procedures Lack of adherence to the current self-inition process and/or training methodology	177 178 176 176 175 174 167 168 245 263 2245 167 168 246 245 245 245 246 249 248 249 249 249 249 249 249 249 249 249 249
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2 3 4 4 5 5 6 6 7 7 8 9 10 111 11 12 13 14 15 16 17 7 18 19 20 21 22 23 24 25 26 27 28 29 30 31 1	24	Brakes not applied correctly	AL19B63	touchdown, failure in CRM leading to brakes not being applied, failure to apply brakes soon after touchdown, disengaging brakes	Inappropriate selection of autobrake mode for given runway length and condition Late thrust reduction or power-on touchdown Delayed selection of reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure Aggressive maneuvering / overcontrolling Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	177 178 176 175 174 167 168 245 263 264 6 32 245 167 168 246 2245 249 249 249 249 249 249 249 249 249 249
2 3 4 4 5 5 6 6 7 7 8 9 10 11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			AL19B63	touchdown, failure in CRM leading to brakes not being applied, failure to apply brakes soon after touchdown, disengaging brakes	Inappropriate selection of autobrake mode for given runway length and condition Late thrust reduction or power-on touchdown Delayed selection of reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in in CRM training procedures Lack of adherence to the main CRM rules Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure Aggressive maneuvering / overcontrolling Lack of adherence to the Current procedures in terms of missed approach execution procedure. Aggressive maneuvering for procedure of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements de	177 178 176 175 174 167 168 245 263 264 6 32 245 167 168 246 245 245 245 249 249 249 249 249 249 249 249 249 249
2 3 4 4 5 5 6 6 7 7 8 9 10 111 11 12 13 14 15 16 17 7 18 19 20 21 22 23 24 25 26 27 28 29 30 31 1		Brakes not applied correctly	AL19B63	touchdown, failure in CRM leading to brakes not being applied, failure to apply brakes soon after touchdown, disengaging brakes during landing roll	Inappropriate selection of autobrake mode for given runway length and condition Late thrust reduction or power-on touchdown Delayed selection of reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of paproach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in cRM training procedures Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of advers	177 178 176 175 174 167 168 245 263 264 6 32 245 167 168 246 246 249 249 249 249 249 249 249 249 249 249



2 3						
3					Go-around attempt after thrust reversers deployment	193
					AOA prevents missed approach	14
4			1		Adverse weather / poor visibility conditions / darkness	6
_					Company of the state of the sta	22
5 6			+		Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing	32 245
7					Pilot tiredness - Inadequate workload distribution	167
8			+		Flaws in pilot requirements definition process and/or training methodology	168
-			+		Lack of adherence to SOP in terms of briefing and checklist before initiating of	100
9					approach and landing	246
10					Flaws in CRM training procedures	263
11					Lack of adherence to the main CRM rules	264
12					Incorrect use of automation - FMS	269
					Lack of adherence to the current technology standards in terms of flight safety	
13					supporting systems. Lack of ILS on descent path	248
					Lack of adherence to SARPs included in Annex 14 and related documents in terms of	
14					temporary suspension of operation on airport inthe case of adverse weather.	249
					Lack of adherence to SARPs included in Annex 14 and related documents in terms of	205
15 16			-		RWY parameters and location, approach path parameters and obstacles locations.	295 494
10				The pilot makes no attempt to control the aircraft after executing a	Unintuitive and / or error prone system manual - FMS	494
1	26	Lack of control	AL19B72	missed approach	Pilot tiredness - Inadequate workload distribution	167
2					Flaws in pilot requirements definition process and/or training methodology	168
3					Lack of adherence to emergency procedures	448
4					Adverse weather / poor visibility conditions / darkness	6
						П
5					Convective weather / turbulence / windshear or crosswind conditions during take-off	32
6					Lack of adherence to SOP in terms of approach and landing	245
7					Pilot tiredness - Inadequate workload distribution	167
8			1		Flaws in pilot requirements definition process and/or training methodology	168
			1		Lack of adherence to SOP in terms of briefing and checklist before initiating of	
9 10			+		approach and landing	246
10 11			+		Flaws in CRM training procedures Lack of adherence to the main CRM rules	263 264
11			+		Incorrect use of automation - FMS	269
12			+		Lack of adherence to the current technology standards in terms of flight safety	209
13			1		supporting systems. Lack of ILS on descent path	248
			<u> </u>		Lack of adherence to SARPs included in Annex 14 and related documents in terms of	
14			1		temporary suspension of operation on airport inthe case of adverse weather.	249
					Lack of adherence to SARPs included in Annex 14 and related documents in terms of	П
15					RWY parameters and location, approach path parameters and obstacles locations.	295
16					Unintuitive and / or error prone system manual - FMS	494
				The pilot applies incorrect control to the aircraft after executing a		
				missed approach. This can be due to improper training, stress and		
1	27	Incorrect Control	AL19B73	fatigue	Pilot tiredness - Inadequate workload distribution	167
2					Flaws in pilot requirements definition process and/or training methodology	168
3 4			+		Lack of adherence to emergency procedures	448 6
4			+		Adverse weather / poor visibility conditions / darkness	ь
5					Convective weather / turbulence / windshear or crosswind conditions during take-off	32
6					Lack of adherence to SOP in terms of approach and landing	245
7			+		Pilot tiredness - Inadequate workload distribution	167
8					Flaws in pilot requirements definition process and/or training methodology	168
					Lack of adherence to SOP in terms of briefing and checklist before initiating of	т
9					approach and landing	246
10					Flaws in CRM training procedures	263
11					Lack of adherence to the main CRM rules	264
12					Incorrect use of automation - FMS	269
					Lack of adherence to the current technology standards in terms of flight safety	
13					supporting systems. Lack of ILS on descent path	248
					Lack of adherence to SARPs included in Annex 14 and related documents in terms of	
14					temporary suspension of operation on airport inthe case of adverse weather.	249
1.			1		Lack of adherence to SARPs included in Annex 14 and related documents in terms of	205
15			+		RWY parameters and location, approach path parameters and obstacles locations.	295 494
16			+	The pilot applies correct measures often executing a miss-d	Unintuitive and / or error prone system manual - FMS	494
			1	The pilot applies correct measures after executing a missed approach but are not enough to prevent aircraft leaving off the side		
1		I .				1 1
	28	Insufficient control	AL19B74		Pilot tiredness - Inadequate workload distribution	167
	28	Insufficient control	AL19B74	of the runway	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168
2	28	Insufficient control	AL19B74		Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures	167 168 448
2	28	Insufficient control	AL19B74		Flaws in pilot requirements definition process and/or training methodology	168
2 3	28	Insufficient control	AL19B74		Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures	168 448
2 3 4 5	28	Insufficient control	AL19B74		Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off	168 448 6
2 3 4 5	28	Insufficient control	AL19B74		Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing	168 448 6 32 245
2 3 4 5 6 7	28	Insufficient control	AL19B74		Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - inadequate workload distribution	168 448 6 32 245 167
2 3 4 5	28	Insufficient control	AL19B74		Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	168 448 6 32 245
2 3 4 5 6 7 8	28	Insufficient control	AL19B74		Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of	168 448 6 32 245 167 168
2 3 4 5 6 7 8	28	Insufficient control	AL19B74		Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing	168 448 6 32 245 167 168
2 3 4 5 6 7 8 9	28	Insufficient control	AL19874		Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures	168 448 6 32 245 167 168 246 263
2 3 4 5 6 7 8 9 10	28	Insufficient control	AL19874		Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules	168 448 6 32 245 167 168 246 263 264
2 3 4 5 6 7 8 9 10	28	Insufficient control	AL19874		Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS	168 448 6 32 245 167 168 246 263
2 3 4 5 6 7 8 9 10 11 12	28	Insufficient control	AL19874		Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the main CRM rules Lack of adherence to the main CRM rules	168 448 6 32 245 167 168 246 263 264 269
2 3 4 5 6 7 8 9 10 11 12	28	Insufficient control	AL19874		Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of il.S on descent path	168 448 6 32 245 167 168 246 263 264
2 3 4 5 6 7 8 9 10 11 12	28	Insufficient control	AL19874		Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of	168 448 6 32 245 167 168 246 263 264 269
2 3 4 5 6 7 8 9 10 11 12	28	Insufficient control	AL19874		Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the main CRM rules Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport in the case of adverse weather.	168 448 6 32 245 167 168 246 263 264 269
2 3 4 5 6 7 8 9 10 11 12	28	Insufficient control	AL19874		Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of	168 448 6 32 245 167 168 246 263 264 269
2 3 4 5 6 7 8 9 10 11 12 13	28	Insufficient control	AL19874		Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of	168 448 6 32 245 167 168 246 263 264 269 248
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	28	Insufficient control	AL19874		Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.	168 448 6 32 245 167 168 246 263 264 269 248
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 VIIII	28		AL19874		Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.	168 448 6 32 245 167 168 246 263 264 269 248
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 VIII +		Insufficient fuel available for next	AL19874		Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Adverse weather / poor visibility conditions / darkness Convective weather / trubulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS	168 448 6 32 245 167 168 246 263 264 269 248
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 VIII +	28	Insufficient fuel available for next approach	AL19874	of the runway	Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.	168 448 6 32 245 167 168 246 263 264 269 248
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 VIII + VIII + I	VIII	Insufficient fuel available for next approach Flight crew fail to notify ATC of		of the runway Flight crew do not inform the ATC that the fuel reserve is not	Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Insufficient fuel available for next approach	168 448 6 32 245 167 168 246 263 264 269 248 249
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 VIII +	VIII	Insufficient fuel available for next approach	AL19874	of the runway	Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Adverse weather / bor visibility conditions / darkness Convective weather / burbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport in the case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of Remyorary suspension of operation on airport in the case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of Remyorary suspension of operation on airport in the case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of Remyorary suspension of operation on airport in the case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of Remyorary suspension of operation on airport in the case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport in the case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport in the case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport in the case of adverse weath	168 448 6 32 245 167 168 246 263 264 269 248 249
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 VIII + VII + I	VIII	Insufficient fuel available for next approach Flight crew fail to notify ATC of		of the runway Flight crew do not inform the ATC that the fuel reserve is not	Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Linsufficient fuel available for next approach Continued unstabilized approach (failure to comply with go-around criteria and policy) Lack of adherence to AIR OPS normal procedures in terms of missed approach	168 448 6 32 245 167 168 246 263 264 269 248 249 295 494
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 VIII + VIII + I	IVIII	Insufficient fuel available for next approach Flight crew fail to notify ATC of		of the runway Flight crew do not inform the ATC that the fuel reserve is not	Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Adverse weather / bor visibility conditions / darkness Convective weather / burbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport in the case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of Remyorary suspension of operation on airport in the case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of Remyorary suspension of operation on airport in the case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of Remyorary suspension of operation on airport in the case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of Remyorary suspension of operation on airport in the case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport in the case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport in the case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport in the case of adverse weath	168 448 6 32 245 167 168 246 263 264 269 248 249



				precursors and CATS base Events		,
5					Adverse weather / poor visibility conditions / darkness	6
6					Convective weather / turbulence / windshear or crosswind conditions during take-off	32
7					Lack of adherence to SOP in terms of approach and landing	245
8					Pilot tiredness - Inadequate workload distribution	167
9					Flaws in pilot requirements definition process and/or training methodology	168
					Lack of adherence to SOP in terms of briefing and checklist before initiating of	
10					approach and landing	246
11					Flaws in CRM training procedures	263
12					Lack of adherence to the main CRM rules	264
13	_				Incorrect use of automation - FMS	269
14					Lack of adherence to the current technology standards in terms of flight safety	248
14					supporting systems. Lack of ILS on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of	240
15					temporary suspension of operation on airport in the case of adverse weather.	249
					Lack of adherence to SARPs included in Annex 14 and related documents in terms of	
16					RWY parameters and location, approach path parameters and obstacles locations.	295
17					Unintuitive and / or error prone system manual - FMS	494
22					AOA prevents missed approach	14
23					Pilot tiredness - Inadequate workload distribution	167
24					Flaws in pilot requirements definition process and/or training methodology	168
					Lack of adherence to AIR OPS normal procedures in terms of missed approach	
25					execution procedure	250
26					Lack of adherence to emergency procedures	448
27				lands and an artist of a second first in a insuff of a second first	Go-around attempt after thrust reversers deployment	193
1	20	Poor flight planning	AL19B8121	Inadequate amount of reserved fuel in aircraft due to poor flight planning	Pilot tiredness - Inadequate workload distribution	167
2	30	r oor night planning	WF1300171	proming	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	168
3			 		Error in calculation of necessary amount of fuel	243
4			 	<u> </u>	Lack of adherence to SOP in terms of necessary amount of fuel	254
5			 		Adverse weather / poor visibility conditions / darkness	235
+			1			Τ,
6			1		Convective weather / turbulence / windshear or crosswind conditions during take-off	32
7					Lack of adherence to SOP in terms of approach and landing	245
8					Pilot tiredness - Inadequate workload distribution	167
9					Flaws in pilot requirements definition process and/or training methodology	168
7					Lack of adherence to SOP in terms of briefing and checklist before initiating of	
10					approach and landing	246
11					Flaws in CRM training procedures	263
12					Lack of adherence to the main CRM rules	264
13					Incorrect use of automation - FMS	269
					Lack of adherence to the current technology standards in terms of flight safety	
14					supporting systems. Lack of ILS on descent path	248
					Lack of adherence to SARPs included in Annex 14 and related documents in terms of	
15					temporary suspension of operation on airport inthe case of adverse weather.	249
					Lack of adherence to SARPs included in Annex 14 and related documents in terms of	
16					RWY parameters and location, approach path parameters and obstacles locations.	295
17	_				Unintuitive and / or error prone system manual - FMS	494
22					AOA prevents missed approach Pilot tiredness - Inadequate workload distribution	167
24					Flaws in pilot requirements definition process and/or training methodology	168
24					Lack of adherence to AIR OPS normal procedures in terms of missed approach	100
25					execution procedure	250
26					Lack of adherence to emergency procedures	448
27					Go-around attempt after thrust reversers deployment	193
1	31	Aircraft diverted from other location	AL19B8122	Aircraft consumes extra fuel during flight due to a route diversion	Convective weather encounter	18
					Missed approach execution necessary after prolonged flight due to e. g. extreme	
2					weather	44
3					Adverse weather / poor visibility conditions / darkness	6
4					Convective weather / turbulence / windshear or crosswind conditions during take-off	32
5					Lack of adherence to SOP in terms of approach and landing	245
6					Pilot tiredness - Inadequate workload distribution	167
7			-		Flaws in pilot requirements definition process and/or training methodology	168
			1		Lack of adherence to SOP in terms of briefing and checklist before initiating of	١,
9			 		approach and landing	246
10	-		 		Flaws in CRM training procedures Lack of adherence to the main CRM rules	264
11	-		 		Incorrect use of automation - FMS	269
11	-		 		Lack of adherence to the current technology standards in terms of flight safety	205
12			1		supporting systems. Lack of ILS on descent path	248
_					Lack of adherence to SARPs included in Annex 14 and related documents in terms of	1-"
13			1		temporary suspension of operation on airport inthe case of adverse weather.	249
$^{+}$					Lack of adherence to SARPs included in Annex 14 and related documents in terms of	
14			I		RWY parameters and location, approach path parameters and obstacles locations.	295
15					Unintuitive and / or error prone system manual - FMS	494
20		<u> </u>			AOA prevents missed approach	14
21					Pilot tiredness - Inadequate workload distribution	167
22					Flaws in pilot requirements definition process and/or training methodology	168
	I		Ι		Lack of adherence to AIR OPS normal procedures in terms of missed approach	1
23					execution procedure	250
24			-		Lack of adherence to emergency procedures	448
25			 	Aircraft has already useful	Go-around attempt after thrust reversers deployment	193
			I	Aircraft has already performed one or more missed approach	System failure affecting the encycling of primer instruments / disclared	
1	33	Aircraft avacutes multiple * * *	AL19B82	previously, and hence the reserved fuel is not sufficient to perform	System failure affecting the operation of primary instruments / displays or standby instruments	26
2	32	Aircraft executes multiple MA	ML13004	the next approach	Pilot tiredness - Inadequate workload distribution	167
3			 	+	Flaws in pilot requirements definition process and/or training methodology	168
4			 	+	Adverse weather / poor visibility conditions / darkness	168
5			 	+	Adverse weather / poor visibility conditions / darkness Adverse weather / poor visibility conditions / darkness	- 6
_			 			+
6			I		Convective weather / turbulence / windshear or crosswind conditions during take-off	32
7			 		Lack of adherence to SOP in terms of approach and landing	245
8			<u> </u>		Pilot tiredness - Inadequate workload distribution	167
			<u> </u>		Flaws in pilot requirements definition process and/or training methodology	168
9	_		t		Lack of adherence to SOP in terms of briefing and checklist before initiating of	1200
9						
10					approach and landing	246
						246



12 13					
13				Lack of adherence to the main CRM rules	264
				Incorrect use of automation - FMS	269
				Lack of adherence to the current technology standards in terms of flight safety	
14				supporting systems. Lack of ILS on descent path	248
				Lack of adherence to SARPs included in Annex 14 and related documents in terms of	
15				temporary suspension of operation on airport inthe case of adverse weather.	249
				Lack of adherence to SARPs included in Annex 14 and related documents in terms of	200
16				RWY parameters and location, approach path parameters and obstacles locations.	295
17				Unintuitive and / or error prone system manual - FMS	494
22				AOA prevents missed approach	14
23				Pilot tiredness - Inadequate workload distribution	16
24				Flaws in pilot requirements definition process and/or training methodology	168
				Lack of adherence to AIR OPS normal procedures in terms of missed approach	
25				execution procedure	250
26				Lack of adherence to emergency procedures	448
27				Go-around attempt after thrust reversers deployment	193
			An abrupt change in wind direction and velocity. A particularly	6	4.
2			hazardous type is a downburst or microburst	Convective weather encounter	18
2				Frontal surface encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of	64
				RWY parameters and location, attitude, approach path parameters and obstacles	
3				locations (e.g. mountains).	225
3	Flight crew fails to detect windshear	+		Flight crew fails to detect windshear	122.
_	riigiit trew fails to detect willdshear	+	A low-level windshear alert system is not installed at the departure		+
1	1 LLWAS not installed	AL23B111		supporting systems. Lack of LLWAS System.	355
2	2 CERANO LIOS HISTORICA	UFF30111	airport	Convective weather encounter	18
3		+		Frontal surface encounter	64
-		+	+	Lack of adherence to SARPs included in Annex 14 and related documents in terms of	1 04
		1		RWY parameters and location, attitude, approach path parameters and obstacles	1
4		1		locations (e.g. mountains).	22!
		+	The LLWAS fails to activate, e.g. due to inadequacies in the	rocerons (e.g. mountains).	+22
		1		Flaws in maintenance technician / airworthiness specialist requirements definition	1
1	2 LLWAS not actiavted	AL23B112	system as a whole	process and/or training methodology	149
-			- Indiana a more	Maintenance technician / airworthiness specialist tiredness - Inadequate workload	+
2		1		distribution	150
+		+	+	Inadequate certification process and / or flaws in methodology concerning verification	
3		1		of the system / product compliance with requirements - LLWAS system	356
4		+		Convective weather encounter	18
5	1	+	+	Frontal surface encounter	64
3				Lack of adherence to SARPs included in Annex 14 and related documents in terms of	₩-
				RWY parameters and location, attitude, approach path parameters and obstacles	
6				locations (e.g. mountains).	225
1	3 Failure of ATC to advise pilot	AL23B113	ATC fails to advise the flight crew that there is a windshear	Traffic controller tiredness - Inadequate workload distribution	13
1	3 Tallule of ATC to advise pilot	ALZSBITS	Are fails to advise the hight crew that there is a windshear	Flaws in traffic controller requirements definition process and/or training	13.
2				methodology	145
-				Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on	+
3				windshear appeared	214
4				Convective weather encounter	18
5				Frontal surface encounter	64
				Lack of adherence to SARPs included in Annex 14 and related documents in terms of	₩.
				RWY parameters and location, attitude, approach path parameters and obstacles	
6				locations (e.g. mountains).	225
0	+	+	Aircraft does not have a predictive windshear system (PWS)	Lack of adherence to the current technology standards in terms of flight safety	122.
1	4 PWS not installed	AL23B121	installed	supporting systems. Lack of PWS System.	215
2	T VVS HOC INStance	ALZSBIZI	instanca	Convective weather encounter	18
3	+	+		Frontal surface encounter	64
3				Lack of adherence to SARPs included in Annex 14 and related documents in terms of	₩-
				RWY parameters and location, attitude, approach path parameters and obstacles	
4				locations (e.g. mountains).	225
4			PWS fails to activate, e.g. due to inadequacies in the software used		122.
		1		System failure affecting the operation of primary instruments / displays or standby	
			but he sustam to predict windshoor or a failure of the sustam as a	System railure affecting the operation of primary instruments / displays of standby	
1	E DWS not activated	A1220122	by the system to predict windshear or a failure of the system as a	instruments	3.
1	5 PWS not activated	AL23B122	by the system to predict windshear or a failure of the system as a whole	instruments Flaus in maintenance technician / airworthingss specialist requirements definition	26
1	5 PWS not activated	AL23B122		Flaws in maintenance technician / airworthiness specialist requirements definition	
2	5 PWS not activated	AL23B122		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
	5 PWS not activated	AL23B122		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	149
2	5 PWS not activated	AL23B122		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	149
	5 PWS not activated	AL23B122		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification	149
3	5 PWS not activated	AL23B122		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system	149 150
3 4 5	5 PWS not activated	AL23B122		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system Flaws in manufacturer quality control process - PWS system components	149 150 150 253 298
3 4 5 6	5 PWS not activated	AL23B122		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system Flaws in manufacturer quality control process - PWS system components Convective weather encounter	149 150 1 253 298
3 4 5	5 PWS not activated	AL23B122		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system Flaws in manufacturer quality control process - PWS system components Convective weather encounter Frontal surface encounter	149 150 150 253 298
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3 4 5 6	5 PWS not activated	AL23B122		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system Flaws in manufacturer quality control process - PWS system components Convective weather encounter Frontal surface encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles	149 150 1 253 298 18
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3 4 5 6 7			whole Flight crew fail to recognise the symptoms of windshear and hence the windshear is not detected when there is no ground or airborne	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system Flaws in manufacturer quality control process - PWS system components Convective weather encounter Frontal surface encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).	149 150 253 298 18 64 229
3 4 5 6 7	5 PWS not activated 6 Crew fail to recognise windshear	AL23B122	whole Flight crew fail to recognise the symptoms of windshear and hence	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system Flaws in manufacturer quality control process - PWS system components Convective weather encounter Frontal surface encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). Pilot tiredness - Inadequate workload distribution	149 150 253 298 18 64 229
3 4 5 6 7			whole Flight crew fail to recognise the symptoms of windshear and hence the windshear is not detected when there is no ground or airborne	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system Flaws in manufacturer quality control process - PWS system components Convective weather encounter Frontal surface encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).	149 150 253 298 18 64 229
3 4 5 6 7 8 8			whole Flight crew fail to recognise the symptoms of windshear and hence the windshear is not detected when there is no ground or airborne	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system Flaws in manufacturer quality control process - PWS system components Convective weather encounter Frontal surface encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	149 150 253 298 18 64 229 163 166 168
3 4 5 6 7 8 8			whole Flight crew fail to recognise the symptoms of windshear and hence the windshear is not detected when there is no ground or airborne	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system Flaws in manufacturer quality control process - PWS system components Convective weather encounter Frontal surface encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Convective weather encounter	149 150 253 298 18 66
3 4 5 6 7 8 8			whole Flight crew fail to recognise the symptoms of windshear and hence the windshear is not detected when there is no ground or airborne	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system Flaws in manufacturer quality control process - PWS system components Convective weather encounter Frontal surface encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Convective weather encounter Frontal surface encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of	149 150 253 298 18 64 229 163 166 168
3 4 5 6 7 8 8			whole Flight crew fail to recognise the symptoms of windshear and hence the windshear is not detected when there is no ground or airborne	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system Flaws in manufacturer quality control process - PWS system components Convective weather encounter Frontal surface encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Convective weather encounter Frontal surface encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles	149 150 253 298 18 64 229 166 168 186 64
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3 4 5 6 7 7 8 8 1 2 3 4			whole Flight crew fail to recognise the symptoms of windshear and hence the windshear is not detected when there is no ground or airborne	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system Flaws in manufacturer quality control process - PWS system components Convective weather encounter Frontal surface encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Convective weather encounter Frontal surface encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles	149 150 253 298 18 64 229 166 168 186 64
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3 4 5 6 7 8 8 1 2 3 4 5	6 Crew fail to recognise windshear Flight crew fails to execute WEM		whole Flight crew fail to recognise the symptoms of windshear and hence the windshear is not detected when there is no ground or airborne warning	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system Flaws in manufacturer quality control process - PWS system components Convective weather encounter Frontal surface encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Convective weather encounter Frontal surface encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).	149 150 253 298 18 64 229 166 168 186 64
3 4 5 6 7 8 8 1 2 2 3 4	6 Crew fail to recognise windshear Flight crew fails to execute WEM successfully	AL23B13	Flight crew fail to recognise the symptoms of windshear and hence the windshear is not detected when there is no ground or airborne warning Windshear is detected by any of the systems available but the	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system Flaws in manufacturer quality control process - PWS system components Convective weather encounter Frontal surface encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Convective weather encounter Frontal surface encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).	14: 15: 29: 16: 6- 16: 16: 6-
3 4 5 6 7 7 8 8 1 1 2 2 3 4 4 5 5 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	6 Crew fail to recognise windshear Flight crew fails to execute WEM		whole Flight crew fail to recognise the symptoms of windshear and hence the windshear is not detected when there is no ground or airborne warning	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system Flaws in manufacturer quality control process - PWS system components Convective weather encounter Frontal surface encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Convective weather encounter Frontal surface encounter Frontal surface encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).	149 150 25: 298 18 64 229 16: 16: 16: 18: 64
3 4 5 6 7 8 8 1 2 3 4 4 5 5	6 Crew fail to recognise windshear Flight crew fails to execute WEM successfully	AL23B13	Flight crew fail to recognise the symptoms of windshear and hence the windshear is not detected when there is no ground or airborne warning Windshear is detected by any of the systems available but the	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system Flaws in manufacturer quality control process - PWS system components Convective weather encounter Frontal surface encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Convective weather encounter Frontal surface encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). Flight crew fails to execute WEM successfully not identifiable at that level Convective weather encounter	149 150 253 298 18 64 229 163 164 18 64 229
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4				locations (e.g. mountains).	225
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1 1 2 3 3 4 4 5 5 6 6 6 7 7 8 8 9 9 10 11 12 13 14 15 16 17 7 18 19 20 21 22 23 24 25 26 27 28 29 30 31 1	3 Lack of control	AL23B42	The pilot makes no attempt to control the aircraft.	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Convective weather encounter Frontal surface encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). System faliure affecting the operation of primary instruments / displays or standby instruments Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system Flaws in manufacturer quality control process - PWS system components Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system Convective weather / turbulence / windshear encounter conditions during landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Tailwind or crosswind	167 168 448 18 64 225 26 137 145 150 167 168 214 215 253 298 355 167 168 167 168 173 174 174 175 176 176 176 176 176 176 176 176 176 176
1 1 2 3 3 4 5 5 6 6 7 8 8 9 9 10 11 12 13 14 15 16 17 18 18 19 19 20 21 22 23 24 25 26 27 28 29 30 0	3 Lack of control	AL23B42	The pilot makes no attempt to control the aircraft.	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Convective weather encounter Frontal surface encounter Lack of adherence to SAPPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). System failure affecting the operation of primary instruments / displays or standby instruments Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system Candidate certification process and / or flaws in methodology concerning verification of the system product compliance with requirements - LUMAS system Convective weather / turbulence / windshear encounter conditions during landing Pilot tiredness - Inadequate workload distribution flaws in pilot requirements definition process and/or training methodology Lack of adherence to me engency procedures - WEM Taliwind or crosswind landing with taliwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Hard landing Bounce	167 168 448 18 64 225 26 137 145 149 150 214 215 223 298 355 65 167 168 173 116 47 118



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34					Maintenance technician / airworthiness specialist tiredness - Inadequate workload	450
35					distribution Flaws in aircraft system maintenance process definition - Landing gear components.	150 377
36			1		Flaws in manufacturer quality control process - Landing gear components.	376
37					Lack of adherence to AFM limitations for landing	251
П				The pilot applies incorrect control to the aircraft. This can be due to		
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3			-		Lack of adherence to emergency procedures Convective weather encounter	448 18
5					Frontal surface encounter	64
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					RWY parameters and location, attitude, approach path parameters and obstacles	
6					locations (e.g. mountains).	225
П					System failure affecting the operation of primary instruments / displays or standby	
7					instruments	26
8					Traffic controller tiredness - Inadequate workload distribution	137
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9			-		methodology Flaws in maintenance technician / airworthiness specialist requirements definition	145
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11					distribution	150
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14					windshear appeared	214
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17			1		Flaws in manufacturer quality control process - PWS system components	298
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18					supporting systems. Lack of LLWAS System.	355
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19			1		of the system / product compliance with requirements - LLWAS system	356
20			1		Convective weather / turbulence / windshear encounter conditions during landing	65
21					Pilot tiredness - Inadequate workload distribution	167
22			-		Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM	168 173
23				 	Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess	1/3
24					of applicable limit(s), either intentionally or unknowingly	116
25					Hard landing	47
26					Bounced landing	118
П					High energy approach due to lack of adequate planning or due to challenging design	П
					of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent,	
27					vectors, altitude or speed restrictions,)	413
28					Late deceleration and configuration set-up for approach and landing	414
29 30			-		DME / ILS DME confusion in assessing the final descent point / FAF Unstabilized final approach (high, fast, steep,)	415 416
31					Tailwind component above limit	415
31			+		Tanwina component above mine	41/
					Inadequate certification process and / or flaws in methodology concerning verification	4 1
32					of the system / product compliance with requirements - Landing gear components	358
					Flaws in maintenance technician / airworthiness specialist requirements definition	
33					process and/or training methodology	149
					Maintenance technician / airworthiness specialist tiredness - Inadequate workload	450
34 35			-		distribution	150 377
36					Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components.	376
37			+		Lack of adherence to AFM limitations for landing	
-						
1				The pilot applies correct measures but are not enough to prevent		251
2	15	Insufficient control	AL23B44	The pilot applies correct measures but are not enough to prevent aircraft leaving off the side of the runway	Pilot tiredness - Inadequate workload distribution	167
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33	 			Lack of adherence to emergency procedures - WEM	173
	 		Flight crew's failure to arm spoilers during the approach or apply on		1,3
-1		1	touchdown, failure in CRM leading to brakes not being applied,		
-1		1	9 11 1		
1	19 Brakes not applied correctly	AL23B53	failure to apply brakes soon after touchdown, disengaging brakes	Failure to arm ground spailers	177
1	18 Brakes not applied correctly	ALZ3B33	during landing roll	Failure to arm ground-spoilers	177
2				Inappropriate selection of autobrake mode for given runway length and condition	178
3				Late thrust reduction or power-on touchdown	176
4				Delayed selection of reverse thrust	175
5				Late activation of pedal braking or takeover from autobrake, when so required	174
6				Pilot tiredness - Inadequate workload distribution	167
7				Flaws in pilot requirements definition process and/or training methodology	168
8				Lack of adherence to SOP in terms of approach and landing	245
9				Flaws in CRM training procedures	263
10				Lack of adherence to the main CRM rules	264
				Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess	П
11				of applicable limit(s), either intentionally or unknowingly	116
12				Hard landing	47
13				Bounced landing	118
14				Deep (long) landing	119
15				Descent above desired descent profile	412
				High energy approach due to lack of adequate planning or due to challenging design	H
				of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent,	
16				vectors, altitude or speed restrictions,)	413
17				Late deceleration and configuration set-up for approach and landing	414
18				DME / ILS DME confusion in assessing the final descent point / FAF	415
19				Unstabilized final approach (high, fast, steep,)	416
20					417
				Tailwind component above limit	
21				Convective weather encounter	18
22				Frontal surface encounter	64
				Lack of adherence to SARPs included in Annex 14 and related documents in terms of	
				RWY parameters and location, attitude, approach path parameters and obstacles	
23				locations (e.g. mountains).	225
				System failure affecting the operation of primary instruments / displays or standby	
24				instruments	26
25				Traffic controller tiredness - Inadequate workload distribution	137
1		1		Flaws in traffic controller requirements definition process and/or training	
26				methodology	145
		1		Flaws in maintenance technician / airworthiness specialist requirements definition	\sqcap
27		<u> </u>		process and/or training methodology	149
				Maintenance technician / airworthiness specialist tiredness - Inadequate workload	\Box
28		1		distribution	150
29				Pilot tiredness - Inadequate workload distribution	167
30				Flaws in pilot requirements definition process and/or training methodology	168
\neg				Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on	П
31		1		windshear appeared	214
				Lack of adherence to the current technology standards in terms of flight safety	┌┤
32		1		supporting systems. Lack of PWS System.	215
\top				Inadequate certification process and / or flaws in methodology concerning verification	
33		1		of the system / product compliance with requirements - PWS system	253
34				Flaws in manufacturer quality control process - PWS system components	298
+	 			Lack of adherence to the current technology standards in terms of flight safety	1-24
35		1		supporting systems. Lack of LLWAS System.	355
	 	\vdash		Inadequate certification process and / or flaws in methodology concerning verification	
20		1		of the system / product compliance with requirements - LLWAS system	356
	_			Convective weather / turbulence / windshear encounter conditions during landing	65
36 37	+			Pilot tiredness - Inadequate workload distribution	167
37					
37 38				Flaws in pilot requirements definition process and/or training methodology	168
37 38 39				Lack of adherence to emergency procedures - WEM	173
37 38		1		Alegeoft handling by group during flooring-	
37 38 39	Aircraft handling by crew during flare		la de la companya de la companya de la companya de la companya de la companya de la companya de la companya de	Aircraft handling by crew during flare inappropriate	\sqcup
37 38 39	Aircraft handling by crew during flare inappropriate	1		Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess	1. !
37 38 39 40	inappropriate	AL25B11	to lose lift and touchdown hard	of applicable limit(s), either intentionally or unknowingly	116
37 38 39					
37 38 39 40 I	inappropriate				32
37 38 39 40 1	inappropriate			Convective weather / turbulence / windshear or crosswind conditions during take-off	
37 38 39 40 1 1 2	inappropriate			Tailwind component above limit	417
37 38 39 40 1 1 2 3 2	inappropriate			Tailwind component above limit Pilot tiredness - Inadequate workload distribution	417 167
37 38 39 40 1 1 2 3 2 3	inappropriate			Tailwind component above limit Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	417 167 168
37 38 39 40 1 1 2 3 2	inappropriate			Tailwind component above limit Pilot tiredness - Inadequate workload distribution	417 167
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				precursors and CATS base Event	Salt	aty cer
6					Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess	116
ь					of applicable limit(s), either intentionally or unknowingly High energy approach due to lack of adequate planning or due to challenging design	116
					of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent,	
7					vectors, altitude or speed restrictions,)	413
8	-		+		Late deceleration and configuration set-up for approach and landing Unstabilized final approach (high, fast, steep,)	414
10			+		Long / floating flare	426
11					Convective weather / turbulence / windshear or crosswind conditions during take-off	32
12	_		-		Lack of adherence to SOP in terms of approach and landing Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	245
13					or / and passive contribution to the PF duties	151
				Flight crew flare too soon so that the increase in angle of attack		
				increases the drag and hence decreases the speed of the aircraft,		
1	3 F	PF flares too soon	AL25B13	which may cause the aircraft to stall and touchdown hard.	Pilot tiredness - Inadequate workload distribution	167
3	-		+		Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing	168 245
3			+	Flight crew fail to correctly flare the aircraft, then it is likely that	Lack of adherence to SOP in terms of approach and failuring	243
				either the aircraft will touchdown hard, if the descent rate is not		
				arrested, or that the aircraft will suffer a tail strike if it is over-		
1	4 F	PF handling incorrect	AL25B14	rotated	Pilot tiredness - Inadequate workload distribution	167
2	\dashv		-	+	Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing	168 245
4	_				Aggressive maneuvering / overcontrolling	182
					Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess	
5					of applicable limit(s), either intentionally or unknowingly	116
H+ 1 H	_	Structural failura			Structural failure	
- 11	-	Structural failure	+	Landing gear/ structure is too weak due to manufacturing defect,	Structural failure	\vdash
1	5 5	Structure too weak	AL25B21	improper maintenance or improper design	Hard landing	47
2					Bounced landing	118
		·				
,				ĺ	Inadequate certification process and / or flaws in methodology concerning verification of the system / graduat compliance with requirements. Landing gear components	35.
3	+			+	of the system / product compliance with requirements - Landing gear components Flaws in maintenance technician / airworthiness specialist requirements definition	358
4					process and/or training methodology	149
					Maintenance technician / airworthiness specialist tiredness - Inadequate workload	
5					distribution	150
6					Flaws in aircraft system maintenance process definition - Landing gear components.	377
8	_		-		Flaws in manufacturer quality control process - Landing gear components. Convective weather encounter	376 18
8	-		+		Convective weather encounter	10
9					Continued unstabilized approach (failure to comply with go-around criteria and policy)	13
					Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess	
10	_				of applicable limit(s), either intentionally or unknowingly	116
11					Convertive weather / turbulance / windshear or crescuind conditions during take off	2.
11	-		+		Convective weather / turbulence / windshear or crosswind conditions during take-off High energy approach due to lack of adequate planning or due to challenging design	32
					of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent,	
12					vectors, altitude or speed restrictions,)	413
13	_				Late deceleration and configuration set-up for approach and landing	414
14 15	_				Unstabilized final approach (high, fast, steep,)	416
16	\rightarrow		_	+	Tailwind component above limit Long / floating flare	417
17	\neg				Lack of adherence to SOP in terms of approach and landing	245
18					Pilot tiredness - Inadequate workload distribution	167
19					Flaws in pilot requirements definition process and/or training methodology	168
20	-				Aggressive maneuvering / overcontrolling Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	182
21					or / and passive contribution to the PF duties	151
1	6 [Design load exceeded	AL25B22	Aircraft is designed correctly but landing load causes failure	Hard landing	47
2					Bounced landing	118
3					Convective weather encounter	18
4	+		+	+	Continued unstabilized approach (failure to comply with go-around criteria and policy) Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess	13
5			1		of applicable limit(s), either intentionally or unknowingly	116
6	_			1	Convective weather / turbulence / windshear or crosswind conditions during take-off	32
			1		High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent,	
7					vectors, altitude or speed restrictions,)	413
8					Late deceleration and configuration set-up for approach and landing	414
9					Unstabilized final approach (high, fast, steep,)	416
10	[Tailwind component above limit	417
11 12	-		+	+	Long / floating flare Lack of adherence to SOP in terms of approach and landing	426 245
	+		+	+	Pilot tiredness - Inadequate workload distribution	167
13					Flaws in pilot requirements definition process and/or training methodology	168
13 14						182
					Aggressive maneuvering / overcontrolling	
14 15					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	
14						151
14 15					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151
14 15 16					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151
14 15 16	F	Flight crew fails to maintain control			Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Flight crew fails to maintain control	151
14 15 16 III + II + I III				No input to controls will allow the flight crew to maintain control of	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Flight crew fails to maintain control	151
14 15 16 III + II + I III		Flight crew fails to maintain control Uncontrollable	AL25B31	No input to controls will allow the flight crew to maintain control of the aircraft.	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Flight crew fails to maintain control finone	
14 15 16 III + II + I III			AL25B31	1	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Flight crew fails to maintain control	151
14 15 16 III + II + I III			AL25B31	1	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Flight crew fails to maintain control finone	18
14 15 16 III + II + I III 2			AL25B31	1	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Flight crew fails to maintain control for the properties of the properties o	18
14 15 16 III + II + I III 2			AL25B31	1	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Flight crew fails to maintain control fonce Convective weather encounter Continued unstabilized approach (failure to comply with go-around criteria and policy)	18



			precursors and CATS base Events	601	sty ceru
				High energy approach due to lack of adequate planning or due to challenging design	
				of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent,	
6				vectors, altitude or speed restrictions,)	413
7				Late deceleration and configuration set-up for approach and landing	414
8				Unstabilized final approach (high, fast, steep,)	416
9				Tailwind component above limit	417
10				Long / floating flare	426
11				Lack of adherence to SOP in terms of approach and landing	245
12				Pilot tiredness - Inadequate workload distribution	167
13				Flaws in pilot requirements definition process and/or training methodology	168
14				Aggressive maneuvering / overcontrolling	182
				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	
15				or / and passive contribution to the PF duties	151
16				Hard landing	47
17				Bounced landing	118
				Inadequate certification process and / or flaws in methodology concerning verification	
18				of the system / product compliance with requirements - Landing gear components	358
				Flaws in maintenance technician / airworthiness specialist requirements definition	
19				process and/or training methodology	149
				Maintenance technician / airworthiness specialist tiredness - Inadequate workload	
20				distribution	150
21				Flaws in aircraft system maintenance process definition - Landing gear components.	377
22				Flaws in manufacturer quality control process - Landing gear components.	376
	8 Lack of control	AL25B32	The pilot makes no attempt to control the aircraft.	Pilot tiredness - Inadequate workload distribution	167
2				Flaws in pilot requirements definition process and/or training methodology	168
3				Lack of adherence to emergency procedures	448
4	 		<u> </u>	Convective weather encounter	18
\vdash	+		<u> </u>		
5				Continued unstabilized approach (failure to comply with go-around criteria and policy)	13
1	 		<u> </u>	Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess	H
6				of applicable limit(s), either intentionally or unknowingly	116
+	+		1		110
7				Convective weather / turbulence / windshear or crosswind conditions during take-off	32
 	+		+	High energy approach due to lack of adequate planning or due to challenging design	32
				of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent,	
, l				vectors, altitude or speed restrictions,)	413
8				Late deceleration and configuration set-up for approach and landing	413
10					414
11	_			Unstabilized final approach (high, fast, steep,)	415
	_			Tailwind component above limit	
12				Long / floating flare	426
13				Lack of adherence to SOP in terms of approach and landing	245
14				Pilot tiredness - Inadequate workload distribution	167
15				Flaws in pilot requirements definition process and/or training methodology	168
16				Aggressive maneuvering / overcontrolling	182
				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	
17				or / and passive contribution to the PF duties	151
18				Hard landing	47
19				Bounced landing	118
				Inadequate certification process and / or flaws in methodology concerning verification	
20				of the system / product compliance with requirements - Landing gear components	358
				Flaws in maintenance technician / airworthiness specialist requirements definition	
21				process and/or training methodology	149
				Maintenance technician / airworthiness specialist tiredness - Inadequate workload	
22				distribution	150
23				Flaws in aircraft system maintenance process definition - Landing gear components.	377
24				Flaws in manufacturer quality control process - Landing gear components.	376
			The pilot applies incorrect control to the aircraft. This can be due to		
1	9 Incorrect Control	AL25B33	improper training, stress and fatigue	Pilot tiredness - Inadequate workload distribution	167
2				Flaws in pilot requirements definition process and/or training methodology	168
3				Lack of adherence to emergency procedures	448
4				Convective weather encounter	18
					П
5				Continued unstabilized approach (failure to comply with go-around criteria and policy)	13
				Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess	П
6				of applicable limit(s), either intentionally or unknowingly	116
\vdash	1				М
7				Convective weather / turbulence / windshear or crosswind conditions during take-off	32
\vdash	 		<u> </u>	High energy approach due to lack of adequate planning or due to challenging design	F
				of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent,	
8				vectors, altitude or speed restrictions,)	413
9	+		<u> </u>	Late deceleration and configuration set-up for approach and landing	414
10	+		1	Unstabilized final approach (high, fast, steep,)	414
11			<u> </u>	Tailwind component above limit	417
12	+		1	Long / floating flare	426
13	+		+	Lack of adherence to SOP in terms of approach and landing	245
14	+			Pilot tiredness - Inadequate workload distribution	167
15	+		+	Flaws in pilot requirements definition process and/or training methodology	168
	+				
16	+			Aggressive maneuvering / overcontrolling	182
17				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	450
17	+				151
18	+			Hard landing	47
19	+		+	Bounced landing	118
				Inadequate contification process and I and I are to send I all I are to send I are to	J J
20				Inadequate certification process and / or flaws in methodology concerning verification	
20	1			of the system / product compliance with requirements - Landing gear components	358
				Flaws in maintenance technician / airworthiness specialist requirements definition	
	•			process and/or training methodology	149
21			1	Maintenance technician / airworthiness specialist tiredness - Inadequate workload	
					150
22				distribution	
22				distribution Flaws in aircraft system maintenance process definition - Landing gear components.	377
22					
22			The pilot applies correct measures but are not enough to prevent	Flaws in aircraft system maintenance process definition - Landing gear components.	377
22 23 24 1 1	0 Insufficient control	AL25B34	The pilot applies correct measures but are not enough to prevent aircraft leaving off the side of the runway	Flaws in aircraft system maintenance process definition - Landing gear components.	377 376 167
22 23 24	.0 Insufficient control	AL25B34		Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components.	377 376 167 168
22 23 24 1 1	0 Insufficient control	AL25B34		Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Pilot tiredness - Inadequate workload distribution	377 376 167
22 23 24 1 1 2	0 Insufficient control	AL25B34		Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	377 376 167 168



5					
6					
6				Continued unstabilized approach (failure to comply with go-around criteria and policy)	13
0				Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess	116
			+	of applicable limit(s), either intentionally or unknowingly	116
7				Convective weather / turbulence / windshear or crosswind conditions during take-off	32
				High energy approach due to lack of adequate planning or due to challenging design	
				of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent,	
8				vectors, altitude or speed restrictions,)	413
9				Late deceleration and configuration set-up for approach and landing	414
10 11				Unstabilized final approach (high, fast, steep,)	416 417
12			+	Tailwind component above limit Long / floating flare	417
13				Lack of adherence to SOP in terms of approach and landing	245
14				Pilot tiredness - Inadequate workload distribution	167
15				Flaws in pilot requirements definition process and/or training methodology	168
16				Aggressive maneuvering / overcontrolling	182
				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	
17				or / and passive contribution to the PF duties	151
18 19			+	Hard landing Bounced landing	47 118
13				Bounced landing	110
				Inadequate certification process and / or flaws in methodology concerning verification	
20				of the system / product compliance with requirements - Landing gear components	358
				Flaws in maintenance technician / airworthiness specialist requirements definition	
21				process and/or training methodology	149
				Maintenance technician / airworthiness specialist tiredness - Inadequate workload	
22		 	-	distribution	150
23 24		-	+	Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components.	377 376
	Aircraft handling by flight crew during	 	<u> </u>	naws in manaracturer quanty control process - Landing gear components.	3/0
	landing roll inappropriate			Aircraft handling by flight crew during landing roll inappropriate	
	G programme		Flight crew applies inappropriate directional handling that affects	5 , 5 0	\Box
1 1	Directional handling failure	AL26B11	the directional stability of the aircraft during the landing roll	Temporary loss of directional control during rollout	120
				High energy approach due to lack of adequate planning or due to challenging design	
		1		of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent,	
2			1	vectors, altitude or speed restrictions,)	413
3				Late deceleration and configuration set-up for approach and landing	414
4				Failure to remember / assess crosswind component limit for prevailing runway condition	418
5				Inadequate crosswind landing / decrab technique	425
6				Touchdown off centerline	427
7				Use of nose wheel steering tiller during rollout	433
8				Lack of adherence to SOP in terms of approach and landing	245
9				Pilot tiredness - Inadequate workload distribution	167
10				Flaws in pilot requirements definition process and/or training methodology	168
	Braking application failure	AL26B12	Flight crew applies inappropriate braking during the landing roll	Failure to arm ground-spoilers	177
3				Inappropriate selection of autobrake mode for given runway length and condition Delayed selection of reverse thrust	178 175
1				Inappropriate use of differential reverse thrust	430
5				Late activation of pedal braking or takeover from autobrake, when so required	174
6				Inadequate use of differential braking	432
7				Lack of adherence to SOP in terms of approach and landing	245
8				Pilot tiredness - Inadequate workload distribution	167
9				Flaws in pilot requirements definition process and/or training methodology	168
			Thrust levers are set incorrectly such that the application of reverse		
1 3	Thrust reverser application failure	AL26B13	thrusters creates asymmetric thrust that affects the directional	Lack of adherence to COD in terms of approach and landing	245
2	Thrust reverser application failure	AL20B13	stability of the aircraft during the landing roll	Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution	167
3				Flaws in pilot requirements definition process and/or training methodology	168
				Lack of adherence to SOP in terms of briefing and checklist before initiating of	
4				approach and landing	246
5				Flaws in CRM training procedures	263
6				Lack of adherence to the main CRM rules	264
_j T				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	
7		 	Weather conditions offert the discretional stability of the 100	or / and passive contribution to the PF duties	151
1 4	Adverse weather condition	AL26B14	Weather conditions affect the directional stability of the aircraft during landing roll	Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly	116
2	Adverse weather continuon	, 120014	warms latinating roll	Convective weather encounter	116
3				Adverse weather / poor visibility conditions / darkness	6
1+					
ll l	Flight crew fails to maintain control			Flight crew fails to maintain control	Ш
_ T			No input to controls will allow the flight crew to maintain control of		
1 5	Uncontrollable	AL26B21	the aircraft.	none	40
4		 	1	Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess	18
3		I	Ì	of applicable limit(s), either intentionally or unknowingly	116
4		—	<u> </u>	Temporary loss of directional control during rollout	120
5				Adverse weather / poor visibility conditions / darkness	6
				High energy approach due to lack of adequate planning or due to challenging design	
		1		of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent,	
					413
6				vectors, altitude or speed restrictions,)	
6 7				Late deceleration and configuration set-up for approach and landing	414
6 7				Late deceleration and configuration set-up for approach and landing Failure to remember / assess crosswind component limit for prevailing runway	414
6 7 8				Late deceleration and configuration set-up for approach and landing Failure to remember / assess crosswind component limit for prevailing runway condition	414
8				Late deceleration and configuration set-up for approach and landing Failure to remember / assess crosswind component limit for prevailing runway	414
8				Late deceleration and configuration set-up for approach and landing Failure to remember / assess crosswind component limit for prevailing runway condition Inappropriate selection of autobrake mode for given runway length and condition	414 418 178
8 9 10 11 12				Late deceleration and configuration set-up for approach and landing Failure to remember / assess crosswind component limit for prevailing runway condition Inappropriate selection of autobrake mode for given runway length and condition Inadequate crosswind landing / decrab technique	414 418 178 425 427 175
8 9 10 11 12 13				Late deceleration and configuration set-up for approach and landing Failure to remember / assess crosswind component limit for prevailing runway condition Inappropriate selection of autobrake mode for given runway length and condition Inadequate crosswind landing / decrab technique Touchdown off centerline Delayed selection of reverse thrust Inappropriate use of differential reverse thrust	414 418 178 425 427 175 430
8 9 10 11 12 13 14				Late deceleration and configuration set-up for approach and landing Failure to remember / assess crosswind component limit for prevailing runway condition Inappropriate selection of autobrake mode for given runway length and condition Inadequate crosswind landing / decrab technique Touchdown off centerline Delayed selection of reverse thrust Inappropriate use of differential reverse thrust Late activation of pedal braking or takeover from autobrake, when so required	414 418 178 425 427 175 430 174
8 9 10 11 12 13 14 15				Late deceleration and configuration set-up for approach and landing Failure to remember / assess crosswind component limit for prevailing runway condition Inappropriate selection of autobrake mode for given runway length and condition Inadequate crosswind landing / decrab technique Touchdown off centerline Delayed selection of reverse thrust Inappropriate use of differential reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Inadequate use of differential braking	414 418 178 425 427 175 430 174 432
8 9 10 11 12 13 14 15 16				Late deceleration and configuration set-up for approach and landing Failure to remember / assess crosswind component limit for prevailing runway condition Inappropriate selection of autobrake mode for given runway length and condition Inadequate crosswind landing / decrab technique Touchdown off centerline Delayed selection of reverse thrust Inappropriate use of differential reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Inadequate use of differential braking Use of nose wheel steering tiller during rollout	414 418 178 425 427 175 430 174 432 433
8 9 10 11 12 13 14 15 16 17				Late deceleration and configuration set-up for approach and landing Failure to remember / assess crosswind component limit for prevailing runway condition Inappropriate selection of autobrake mode for given runway length and condition Inadequate crosswind landing / decrab technique Touchdown off centerline Delayed selection of reverse thrust Inappropriate use of differential reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Inadequate use of differential braking Use of nose wheel steering tiller during rollout Lack of adherence to SOP in terms of approach and landing	414 418 178 425 427 175 430 174 432 433 245
8 9 10 11 12 13 14 15 16				Late deceleration and configuration set-up for approach and landing Failure to remember / assess crosswind component limit for prevailing runway condition Inappropriate selection of autobrake mode for given runway length and condition Inadequate crosswind landing / decrab technique Touchdown off centerline Delayed selection of reverse thrust Inappropriate use of differential reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Inadequate use of differential braking Use of nose wheel steering tiller during rollout	414 418 178 425 427 175 430 174 432 433
8 9 10 11 12 13 14 15 16 17 18				Late deceleration and configuration set-up for approach and landing Failure to remember / assess crosswind component limit for prevailing runway condition Inappropriate selection of autobrake mode for given runway length and condition Inadequate crosswind landing / decrab technique Touchdown off centerline Delayed selection of reverse thrust Inappropriate use of differential reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Inadequate use of differential braking Use of nose wheel steering tiller during rollout Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution	414 418 178 425 427 175 430 174 432 433 245 167



				precursors and CATS Base Events	S S S S S S S S S S S S S S S S S S S	esy cer
21					Flaws in CRM training procedures	263
22					Lack of adherence to the main CRM rules	264
					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	l
23 1	c	Lack of control	AL26B22	The pilet makes as attempt to control the aircraft	or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution	151 167
2		Lack of control	ALZOBZZ	The pilot makes no attempt to control the aircraft.	Flaws in pilot requirements definition process and/or training methodology	168
3					Lack of adherence to emergency procedures	448
4					Convective weather encounter	18
					Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess	
5					of applicable limit(s), either intentionally or unknowingly	116
6 7					Temporary loss of directional control during rollout	120
					Adverse weather / poor visibility conditions / darkness High energy approach due to lack of adequate planning or due to challenging design	6
					of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent,	
8					vectors, altitude or speed restrictions,)	413
9					Late deceleration and configuration set-up for approach and landing	414
					Failure to remember / assess crosswind component limit for prevailing runway	l
10 11					condition	418 178
12					Inappropriate selection of autobrake mode for given runway length and condition Inadequate crosswind landing / decrab technique	425
13					Touchdown off centerline	427
14					Delayed selection of reverse thrust	175
15					Inappropriate use of differential reverse thrust	430
16					Late activation of pedal braking or takeover from autobrake, when so required	174
17					Inadequate use of differential braking	432
18 19			+		Use of nose wheel steering tiller during rollout Lack of adherence to SOP in terms of approach and landing	433 245
19 20			+		Pilot tiredness - Inadequate workload distribution	167
21					Flaws in pilot requirements definition process and/or training methodology	168
					Lack of adherence to SOP in terms of briefing and checklist before initiating of	
22					approach and landing	246
23					Flaws in CRM training procedures	263
24			+		Lack of adherence to the main CRM rules Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	264
25					or / and passive contribution to the PF duties	151
			+	The pilot applies incorrect control to the aircraft. This can be due to	passes services and it desires	101
1	7	Incorrect Control	AL26B23	improper training, stress and fatigue	Pilot tiredness - Inadequate workload distribution	167
2					Flaws in pilot requirements definition process and/or training methodology	168
3					Lack of adherence to emergency procedures	448
4					Convective weather encounter	18
5					Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly	116
6				+	Temporary loss of directional control during rollout	120
7					Adverse weather / poor visibility conditions / darkness	6
П					High energy approach due to lack of adequate planning or due to challenging design	
					of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent,	
8					vectors, altitude or speed restrictions,)	413
9					Late deceleration and configuration set-up for approach and landing	414
10					Failure to remember / assess crosswind component limit for prevailing runway condition	418
11					Inappropriate selection of autobrake mode for given runway length and condition	178
12					Inadequate crosswind landing / decrab technique	425
13					Touchdown off centerline	427
14					Delayed selection of reverse thrust	175
15 16					Inappropriate use of differential reverse thrust	430 174
17					Late activation of pedal braking or takeover from autobrake, when so required Inadequate use of differential braking	432
18					Use of nose wheel steering tiller during rollout	433
19					Lack of adherence to SOP in terms of approach and landing	245
20					Pilot tiredness - Inadequate workload distribution	167
21					Flaws in pilot requirements definition process and/or training methodology	168
22					Lack of adherence to SOP in terms of briefing and checklist before initiating of	246
22 23				+	approach and landing Flaws in CRM training procedures	246 263
24			+		Lack of adherence to the main CRM rules	264
Ť					Lack of adherence to the Main talks of PNF flight parameters / situation monitoring	
25					or / and passive contribution to the PF duties	151
٦				The pilot applies correct measures but are not enough to prevent		
1	8	Insufficient control	AL26B24	aircraft leaving off the side of the runway	Pilot tiredness - Inadequate workload distribution	167
_	1	I .	1	+	Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures	168
2						1110
3						448 18
					Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess	448 18
3 4 5					Convective weather encounter	
3 4 5 6					Convective weather encounter Tallwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout	18 116 120
3 4 5					Convective weather encounter Talkinid or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness	116
3 4 5 6					Convective weather encounter Tallwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness High energy approach due to lack of adequate planning or due to challenging design	18 116 120
3 4 5 6					Convective weather encounter Tallwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent,	116 120 6
3 4 5 6 7					Convective weather encounter Tallwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness High energy approach due to lack of adequate planning or due to challenging design	18 116 120
3 4 5 6 7					Convective weather encounter Taliwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,)	116 120 6
3 4 5 6 7 8 9					Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Failure to remember / assess crosswind component limit for prevailing runway condition	116 120 6 413 414
3 4 5 6 7 8 9					Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Failure to remember / assess crosswind component limit for prevailing runway condition Inappropriate selection of autobrake mode for given runway length and condition	116 120 6 413 414 418
3 4 5 6 7 8 9 10 11 12					Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Failure to remember / assess crosswind component limit for prevailing runway condition Inappropriate selection of autobrake mode for given runway length and condition Inadequate crosswind landing / decrab technique	116 120 6 413 414 418 178 425
3 4 5 6 7 8 9 10 11 12 13					Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Failure to remember / assess crosswind component limit for prevailing runway condition Inappropriate selection of autobrake mode for given runway length and condition Inadequate crosswind landing / decrab technique Touchdown off centerline	116 120 6 413 414 418 178 425 427
3 4 5 6 7 8 9 10 11 12 13					Convective weather encounter Taliwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Failure to remember / assess crosswind component limit for prevailing runway condition Inappropriate selection of autobrake mode for given runway length and condition Inadequate crosswind landing / decrab technique Touchdown off centerline Delayed selection of reverse thrust	116 120 6 413 414 418 427 427 175
3 4 5 6 7 8 9 10 11 12 13 14					Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Failure to remember / assess crosswind component limit for prevailing runway condition Inappropriate selection of autobrake mode for given runway length and condition Inadequate crosswind landing / decrab technique Touchdown off centerline Delayed selection of reverse thrust Inappropriate use of differential reverse thrust	116 120 6 413 414 418 427 427 430 430
3 4 5 6 7 8 9 10 11 12 13 14 15 16					Convective weather encounter Taliwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Failure to remember / assess crosswind component limit for prevailing runway condition Inappropriate selection of autobrake mode for given runway length and condition Inadequate crosswind landing / decrab technique Touchdown off centerline Delayed selection of reverse thrust	116 120 6 413 414 418 425 427 430 174
3 4 5 6 7 8 9 10 11 12 13 14 15 16 17					Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Failure to remember / assess crosswind component limit for prevailing runway condition Inappropriate selection of autobrake mode for given runway length and condition Inadequate crosswind landing / decrab technique Touchdown off centerline Delayed selection of reverse thrust Inappropriate use of differential reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Inadequate use of differential braking Use of nose wheel steering tiller during rollout	116 120 6 413 414 418 425 427 175 430 174 433 433
3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19					Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Failure to remember / assess crosswind component limit for prevailing runway condition Inappropriate selection of autobrake mode for given runway length and condition Inadequate crosswind landing / decrab technique Touchdown off centerline Delayed selection of reverse thrust Inappropriate use of differential reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Inadequate use of differential braking Use of nose wheel steering tiller during rollout Lack of adherence to SOP in terms of approach and landing	116 120 6 413 414 418 418 425 427 179 430 174 432 433 245
3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20					Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes),) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Failure to remember / assess crosswind component limit for prevailing runway condition Inappropriate selection of autobrake mode for given runway length and condition Inaperporpiate selection of reverse thrust Inappropriate or reverse thrust Inappropriate use of differential reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Inadequate use of differential braking Use of nose wheel steering tiller during rollout Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution	116 120 6 413 414 418 425 427 179 430 174 432 433 245 167
3 4 5 6 7					Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Failure to remember / assess crosswind component limit for prevailing runway condition Inappropriate selection of autobrake mode for given runway length and condition Inadequate crosswind landing / decrab technique Touchdown off centerline Delayed selection of reverse thrust Inappropriate use of differential reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Inadequate use of differential braking Use of nose wheel steering tiller during rollout Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	1166 1200 6 4133 4144 4188 425 427 175 430 174 432 433 245 167
3 4 5 6 7 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21					Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) tate deceleration and configuration set-up for approach and landing Failure to remember / assess crosswind component limit for prevailing runway condition Inappropriate selection of autobrake mode for given runway length and condition Inadequate crosswind landing / decrab technique Touchdown off centerline Delayed selection of reverse thrust Inappropriate use of differential reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Inadequate use of differential braking Use of nose wheel steering tiller during rollout Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of	1166 120 66 413 414 418 178 425 427 175 430 174 432 433 245 167
3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20					Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Failure to remember / assess crosswind component limit for prevailing runway condition Inappropriate selection of autobrake mode for given runway length and condition Inadequate crosswind landing / decrab technique Touchdown off centerline Delayed selection of reverse thrust Inappropriate use of differential reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Inadequate use of differential braking Use of nose wheel steering tiller during rollout Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	116 120 6



				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	
25				or / and passive contribution to the PF duties	151
Ш					
+ 11					
+ 1 111	Failure to achieve maximum braking			Failure to achieve maximum braking	₩
			Runway can be too short under wet or icy runway conditions for plane to stop even if touchdown is successful and brakes are	Adverse weather in terms of heavy rain or icing conditions resulted with decreased	
1	9 Insufficient Runway Length	AL26B31	applied and functioning.	RWY surface friction rate	45
2	, ,			Pilot tiredness - Inadequate workload distribution	167
3			_	Flaws in pilot requirements definition process and/or training methodology	168
				Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below	
4				minimum	203
5			†	Convective weather encounter	18
				Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess	
6				of applicable limit(s), either intentionally or unknowingly	116
7 8		-		Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness	120 6
٥			+	High energy approach due to lack of adequate planning or due to challenging design	+-
				of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent,	
9				vectors, altitude or speed restrictions,)	413
10			ļ	Late deceleration and configuration set-up for approach and landing	414
11				Failure to remember / assess crosswind component limit for prevailing runway condition	418
12		+	+	Inappropriate selection of autobrake mode for given runway length and condition	178
13			<u> </u>	Inadequate crosswind landing / decrab technique	425
14				Touchdown off centerline	427
15		+	 	Delayed selection of reverse thrust	175
16 17	+	+	+	Inappropriate use of differential reverse thrust Late activation of pedal braking or takeover from autobrake, when so required	430 174
18		1	†	Inadequate use of differential braking	432
19				Use of nose wheel steering tiller during rollout	433
20				Lack of adherence to SOP in terms of approach and landing	245
21		+		Pilot tiredness - Inadequate workload distribution	167
22	+	+	+	Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of	168
23				approach and landing	246
24				Flaws in CRM training procedures	263
25				Lack of adherence to the main CRM rules	264
26				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	
26 27			-	or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution	151 167
28			†	Flaws in pilot requirements definition process and/or training methodology	168
29				Lack of adherence to emergency procedures	448
			Brakes are not giving maximum braking, i.e. because of improper	System failures that may affect braking devices (ground spoilers, brakes / autobrake,	
1	10 Brakes not functioning correctly	AL26B32	maintenance and damages	thrust reversers)	15
2				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
				Maintenance technician / airworthiness specialist tiredness - Inadequate workload	T
3				distribution	150
4				Convective weather encounter	18
_				Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess	116
6			+	of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout	120
7			†	Adverse weather / poor visibility conditions / darkness	6
				High energy approach due to lack of adequate planning or due to challenging design	
				of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent,	443
9			-	vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing	413 414
3			+	Failure to remember / assess crosswind component limit for prevailing runway	717
10				condition	
11				Condition	418
12				Inappropriate selection of autobrake mode for given runway length and condition	178
14				Inappropriate selection of autobrake mode for given runway length and condition Inadequate crosswind landing / decrab technique	178 425
± 11				Inappropriate selection of autobrake mode for given runway length and condition Inadequate crosswind landing / decrab technique Touchdown off centerline	178 425 427
15				Inappropriate selection of autobrake mode for given runway length and condition Inadequate crosswind landing / decrab technique	178 425
16				Inappropriate selection of autobrake mode for given runway length and condition Inadequate crosswind landing / decrab technique Touchdown off centerline Delayed selection of reverse thrust Inappropriate use of differential reverse thrust Late activation of pedal braking or takeover from autobrake, when so required	178 425 427 175 430 174
16 17				Inappropriate selection of autobrake mode for given runway length and condition Inadequate crosswind landing / decrab technique Touchdown off centerline Delayed selection of reverse thrust Inappropriate use of differential reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Inadequate use of differential braking	178 425 427 175 430 174 432
16 17 18				Inappropriate selection of autobrake mode for given runway length and condition Inadequate crosswind landing / decrab technique Touchdown off centerline Delayed selection of reverse thrust Inappropriate use of differential reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Imadequate use of differential braking Use of nose wheel steering tiller during rollout	178 425 427 175 430 174 432 433
16 17 18 19				Inappropriate selection of autobrake mode for given runway length and condition Inadequate crosswind landing / decrab technique Touchdown off centerline Delayed selection of reverse thrust Inappropriate use of differential reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Inadequate use of differential braking	178 425 427 175 430 174 432 433 245
16 17 18				Inappropriate selection of autobrake mode for given runway length and condition Inadequate crosswind landing / decrab technique Touchdown off centerline Delayed selection of reverse thrust Inappropriate use of differential reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Inadequate use of differential braking Use of nose wheel steering tiller during rollout Lack of adherence to SOP in terms of approach and landing	178 425 427 175 430 174 432 433
16 17 18 19 20 21				Inappropriate selection of autobrake mode for given runway length and condition Inadequate crosswind landing / decrab technique Touchdown off centerline Delayed selection of reverse thrust Inappropriate use of differential reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Inadequate use of differential braking Use of nose wheel steering tiller during rollout Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of	178 425 427 175 430 174 432 433 245 167
16 17 18 19 20 21				Inappropriate selection of autobrake mode for given runway length and condition Inadequate crosswind landing / decrab technique Touchdown off centerline Delayed selection of reverse thrust Inappropriate use of differential reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Inadequate use of differential braking Use of nose wheel steering tiller during rollout Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing	178 425 427 175 430 174 432 433 245 167 168
16 17 18 19 20 21 22 23				Inappropriate selection of autobrake mode for given runway length and condition Inadequate crosswind landing / decrab technique Touchdown off centerline Delayed selection of reverse thrust Inappropriate use of differential reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Inadequate use of differential braking Use of nose wheel steering tiller during rollout Lack of adherence to SOP in terms of approach and landing Pilot tiredness- Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures	178 425 427 175 430 174 432 433 245 167 168 246
16 17 18 19 20 21				Inappropriate selection of autobrake mode for given runway length and condition Inadequate crosswind landing / decrab technique Touchdown off centerline Delayed selection of reverse thrust Inappropriate use of differential reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Inadequate use of differential braking Use of nose wheel steering tiller during rollout Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing	178 425 427 175 430 174 432 433 245 167 168 246 263 264
16 17 18 19 20 21 22 23				Inappropriate selection of autobrake mode for given runway length and condition Inadequate crosswind landing / decrab technique Touchdown off centerline Delayed selection of reverse thrust Inappropriate use of differential reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Imadequate use of differential braking Use of nose wheel steering tiller during rollout Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules	178 425 427 175 430 174 432 433 245 167 168 246 263 264
16 17 18 19 20 21 22 23 24 25 26				Inappropriate selection of autobrake mode for given runway length and condition Inadequate crosswind landing / decrab technique Touchdown off centerline Delayed selection of reverse thrust Inappropriate use of differential reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Inadequate use of differential braking Use of nose wheel steering tiller during rollout Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution	178 425 427 175 430 174 432 433 245 167 168 246 263 264 151
16 17 18 19 20 21 22 23 24 25 26 27				Inappropriate selection of autobrake mode for given runway length and condition Inadequate crosswind landing / decrab technique Touchdown off centerline Delayed selection of reverse thrust Inappropriate use of differential reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Inadequate use of differential braking Use of nose wheel steering tiller during rollout Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of priefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the Pf duties Fliot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	178 425 427 175 430 174 432 433 245 167 168 246 263 264 151 167 168
16 17 18 19 20 21 22 23 24 25 26			Elight crew's failure to arm spoilers during the approach or apply on	Inappropriate selection of autobrake mode for given runway length and condition Inadequate crosswind landing / decrab technique Touchdown off centerline Delayed selection of reverse thrust Inappropriate use of differential reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Inadequate use of differential braking Use of nose wheel steering tiller during rollout Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Lack of adherence to the main CRM rules Flack of adherence to the main CRM rules Flict tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to the main CRM rules	178 425 427 175 430 174 432 433 245 167 168 246 263 264 151
16 17 18 19 20 21 22 23 24 25 26 27 28			Flight crew's failure to arm spoilers during the approach or apply on touchdown, failure in CRM leading to brakes not being applied, failure to apply brakes soon after touchdown, disengaging brakes	Inappropriate selection of autobrake mode for given runway length and condition Inadequate crosswind landing / decrab technique Touchdown off centerline Delayed selection of reverse thrust Inappropriate use of differential reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Inadequate use of differential braking Use of nose wheel steering tiller during rollout Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Lack of adherence to the main CRM rules Lack of adherence to the main CRM rules Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to the main CRM rules Lack of adherence to the main CRM rul	178 425 427 175 430 174 432 433 245 167 168 263 264 151 167 168 448
16 17 18 19 20 21 22 23 24 25 26 27 28	11 Brakes not applied correctly	AL26B33	touchdown, failure in CRM leading to brakes not being applied,	Inappropriate selection of autobrake mode for given runway length and condition Inadequate crosswind landing / decrab technique Touchdown off centerline Delayed selection of reverse thrust Inappropriate use of differential reverse thrust Inappropriate use of differential reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Inadequate use of differential braking Use of nose wheel steering tiller during rollout Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures	178 425 427 175 430 174 432 433 245 167 168 246 263 264 151 167 168 448
16	11 Brakes not applied correctly	AL26B33	touchdown, failure in CRM leading to brakes not being applied, failure to apply brakes soon after touchdown, disengaging brakes	Inappropriate selection of autobrake mode for given runway length and condition Inadequate crosswind landing / decrab technique Touchdown off centerline Delayed selection of reverse thrust Inappropriate use of differential reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Inadequate use of differential braking Use of nose wheel steering tiller during rollout Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of priefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to the sop in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Failure to arm ground-spoilers Inappropriate selection of autobrake mode for given runway length and condition	178 425 427 175 430 174 433 245 167 168 246 263 264 151 167 168 448
16	11 Brakes not applied correctly	AL26B33	touchdown, failure in CRM leading to brakes not being applied, failure to apply brakes soon after touchdown, disengaging brakes	Inappropriate selection of autobrake mode for given runway length and condition Inadequate crosswind landing / decrab technique Touchdown off centerline Delayed selection of reverse thrust Inappropriate use of differential reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Inadequate use of differential braking Use of nose wheel steering tiller during rollout Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of priefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Lack of adherence to the main CRM rules Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to the main CRM rules Lack of adherence to the main CRM rul	178 425 427 175 430 174 432 433 245 167 168 246 263 264 151 167 168 448
16	11 Brakes not applied correctly	AL26B33	touchdown, failure in CRM leading to brakes not being applied, failure to apply brakes soon after touchdown, disengaging brakes	Inappropriate selection of autobrake mode for given runway length and condition Inadequate crosswind landing / decrab technique Touchdown off centerline Delayed selection of reverse thrust Inappropriate use of differential reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Inadequate use of differential braking Use of nose wheel steering tiller during rollout Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of priefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to the sop in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Failure to arm ground-spoilers Inappropriate selection of autobrake mode for given runway length and condition	178 425 427 175 430 430 175 168 246 151 167 177 178 176 175 176 175 176 175 176 175 176 175 176 175 176 175 176 175 176 175 176 175 176 175 176 175 176 175 176 175 176 175 176 175 176 175 176 177 178 176 177 178 176 177 178 176 177 178 176 177 178 176 177 178 176 177 178 178 176 177 178 178 178 178 178 178 178 178 178
16	11 Brakes not applied correctly	AL26B33	touchdown, failure in CRM leading to brakes not being applied, failure to apply brakes soon after touchdown, disengaging brakes	Inappropriate selection of autobrake mode for given runway length and condition Inadequate crosswind landing / decrab technique Touchdown off centerline Delayed selection of reverse thrust Inappropriate use of differential reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Inadequate use of differential braking Use of nose wheel steering tiller during rollout Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of priefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Lack of adherence to the main CRM rules Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the Pf duties Pilot tiredness - inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Failure to arm ground-spoilers Inappropriate selection of autobrake mode for given runway length and condition Late thrust reduction or power-on touchdown Delayed selection of pedal braking or takeover from autobrake, when so required Lack of adherence to SOP in terms of approach and landing	178 425 427 175 430 174 432 433 245 167 168 246 263 264 151 167 168 448 177 178 177 178 176 177 179 179 179 179 179 179 179 179 179
16	11 Brakes not applied correctly	AL26B33	touchdown, failure in CRM leading to brakes not being applied, failure to apply brakes soon after touchdown, disengaging brakes	Inappropriate selection of autobrake mode for given runway length and condition Inadequate crosswind landing / decrab technique Touchdown off centerline Delayed selection of reverse thrust Inappropriate use of differential reverse thrust Inappropriate use of differential reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Inadequate use of differential braking Use of nose wheel steering tiller during rollout Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Failure to arm ground-spoilers Inappropriate selection of autobrake mode for given runway length and condition Late thrust reduction or power-on touchdown Delayed selection of reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution	178 425 427 430 174 432 433 264 263 264 151 167 168 448 177 178 176 175 175 175 167
16 17 18 19 20 21 22 23 24 25 26 27 28 27 28 3 4 5 6 6 7 7 8	11 Brakes not applied correctly	AL26B33	touchdown, failure in CRM leading to brakes not being applied, failure to apply brakes soon after touchdown, disengaging brakes	Inappropriate selection of autobrake mode for given runway length and condition Inadequate crosswind landing / decrab technique Touchdown off centerline Delayed selection of reverse thrust Inappropriate use of differential reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Inadequate use of differential braking Use of nose wheel steering tiller during rollout Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of priefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to the main CRM rules Lack of adherence to the sop in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Failure to arm ground-spoilers Inappropriate selection of autobrake mode for given runway length and condition Late thrust reduction or power-on touchdown Delayed selection of reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Lack of adherence to SOP in terms of approach and landing Flaws in pilot requirements definition process and/or training methodology	178 425 427 175 430 174 432 245 167 168 246 263 264 151 167 168 448 177 178 176 175 175 174 174 174 174 175 176 177 174
16	11 Brakes not applied correctly	AL26833	touchdown, failure in CRM leading to brakes not being applied, failure to apply brakes soon after touchdown, disengaging brakes	Inappropriate selection of autobrake mode for given runway length and condition Inadequate crosswind landing / decrab technique Touchdown off centerline Delayed selection of reverse thrust Inappropriate use of differential reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Inadequate use of differential braking Use of nose wheel steering tiller during rollout Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of priefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Failure to arm ground-spoilers Inappropriate selection of autobrake mode for given runway length and condition Late thrust reduction or power-on touchdown Delayed selection of reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Flaws in pilot requirements definition process and/or training methodology Flaws in pilot requirements definition process and/or training methodology Flaws in pilot requirements definition process and/or training methodology	178 425 427 175 430 174 432 245 167 168 246 263 264 151 167 178 177 178 177 178 177 178 177 178 179 179 179 179 179 179 179 179 179 179
16 17 18 19 20 21 22 23 24 25 26 27 28 27 28 3 4 5 6 6 7 7 8	11 Brakes not applied correctly	AL26B33	touchdown, failure in CRM leading to brakes not being applied, failure to apply brakes soon after touchdown, disengaging brakes	Inappropriate selection of autobrake mode for given runway length and condition Inadequate crosswind landing / decrab technique Touchdown off centerline Delayed selection of reverse thrust Inappropriate use of differential reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Inadequate use of differential braking Use of nose wheel steering tiller during rollout Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of priefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to the main CRM rules Lack of adherence to the sop in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Failure to arm ground-spoilers Inappropriate selection of autobrake mode for given runway length and condition Late thrust reduction or power-on touchdown Delayed selection of reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Lack of adherence to SOP in terms of approach and landing Flaws in pilot requirements definition process and/or training methodology	178 425 427 175 430 174 432 245 167 168 246 253 264 151 167 178 176 177 178 176 175 174 245 167 168 263 264
16 17 18 19 20 21 22 23 24 25 26 27 28 2 3 4 5 6 7 8 9 110 10	11 Brakes not applied correctly	AL26B33	touchdown, failure in CRM leading to brakes not being applied, failure to apply brakes soon after touchdown, disengaging brakes	Inappropriate selection of autobrake mode for given runway length and condition Inadequate crosswind landing / decrab technique Touchdown off centerline Delayed selection of reverse thrust Inappropriate use of differential reverse thrust Inappropriate use of differential reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Inadequate use of differential braking Use of nose wheel steering tiller during rollout Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of priefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Lack of adherence to the main CRM rules Lack of adherence to the Poly in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Failure to arm ground-spoilers Inappropriate selection of autobrake mode for given runway length and condition Late thrust reduction or power-on touchdown Delayed selection of reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Flaws in CRM training procedures Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in CRM training procedures Lack of adherence to SOP in terms of approach and landing	178 425 427 175 430 174 432 245 167 168 246 263 264 151 167 168 448 177 178 176 175 175 174 174 174 174 175 176 177 174



			precursors and CATS Base Events	saf	ety cer
13				Temporary loss of directional control during rollout	120
14				Adverse weather / poor visibility conditions / darkness	e
15				High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,)	413
16	+			Late deceleration and configuration set-up for approach and landing	414
				Failure to remember / assess crosswind component limit for prevailing runway	
17				condition	418
18				Inappropriate selection of autobrake mode for given runway length and condition	178
19 20				Inadequate crosswind landing / decrab technique Touchdown off centerline	425
21				Delayed selection of reverse thrust	175
22				Inappropriate use of differential reverse thrust	430
23				Late activation of pedal braking or takeover from autobrake, when so required	174
24				Inadequate use of differential braking	432
25				Use of nose wheel steering tiller during rollout	433
26 27				Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution	245 167
28				Flaws in pilot requirements definition process and/or training methodology	168
				Lack of adherence to SOP in terms of briefing and checklist before initiating of	
29				approach and landing	246
30				Flaws in CRM training procedures	263
31				Lack of adherence to the main CRM rules	264
22				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	15:
32 33				Pilot tiredness - Inadequate workload distribution	16
34			+	Flaws in pilot requirements definition process and/or training methodology	168
35				Lack of adherence to emergency procedures	448
	Aircraft directional control related				
1	systems failure			Aircraft directional control related systems failure	_
1	1 Landing goar outonsian falling	AL 270444	Any failure of the landing goar to outend	System failure affecting the operation of primary instruments / displays or standby	
1	1 Landing gear extension failure	AL27B111	Any failure of the landing gear to extend or remain extended	instruments Flaws in maintenance technician / airworthiness specialist requirements definition	26
2				process and/or training methodology	149
1	1			Maintenance technician / airworthiness specialist tiredness - Inadequate workload	
3				distribution	150
				Inadequate certification process and / or flaws in methodology concerning verification	
4				of the system / product compliance with requirements - Landing gear components	358
5				Flaws in aircraft system maintenance process definition - Landing gear components.	37
			Failure due to the presence of a crack or similar defect in the	System failure affecting the operation of primary instruments / displays or standby	_
1	2 Landing gear structure too weak	AL27B112	landing gear	instruments	37
2			+	Flaws in manufacturer quality control process - Landing gear components. Flaws in maintenance technician / airworthiness specialist requirements definition	3/0
3				process and/or training methodology	149
				Maintenance technician / airworthiness specialist tiredness - Inadequate workload	
4				distribution	150
			A foreign object strikes and damages the landing gear, including		
1	3 Foreign object damage to landing gear	AL27B113	debris on runway and birds	Tire burst	80
3				Contaminated Runway Bird strike	39
4				Wildlife incursion	3-
				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence	
6				of contaminations.	216
				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction	
7				procedure	162
				Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129
8				Flaws in vehicle driver / equipment operator / ground agent requirements definition	12:
9				process and/or training methodology	130
	Landing gear failure due to inadequate				
1	4 maintenance	AL27B114	Maintenance fail to service the gear or service the gear incorrectly	Flaws in aircraft system maintenance process definition - Landing gear components.	377
				Flaws in maintenance technician / airworthiness specialist requirements definition	
2				process and/or training methodology	149
3				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
,	+			and the second s	13(
	Landing gear failure due to inadequate		Design of the gear is inadequate and this design flaw directly causes	s Inadequate certification process and / or flaws in methodology concerning verification	
1	5 design	AL27B115	the failure of the gear	of the system / product compliance with requirements - Landing gear components	35
			Failure due to the presence of a crack or similar defect in any part	System failure affecting the operation of primary instruments / displays or standby	
1	6 Wheel structure too weak	AL27B121	of the wheel system	instruments	2
2	+			Flaws in aircraft system maintenance process definition - Landing gear components.	37
3				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	14
1	+			Maintenance technician / airworthiness specialist tiredness - Inadequate workload	17
4				distribution	150
5				Tire burst	80
			A foreign object strikes and damages the wheels, including debris		
1	7 Foreign object damage to wheels	AL27B122	on runway and birds	Tire burst	8
3	+			Contaminated Runway Bird strike	3
4	+			Wildlife incursion	34
1	1			Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence	T,
5	<u> </u>			integrity monitoring	40:
				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence	
6	1			of contaminations.	21
7				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction	10
	+		+	procedure Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	16
1				distribution	12
8		1		Flaws in vehicle driver / equipment operator / ground agent requirements definition	
8		1			13
8				process and/or training methodology	
8	Wheel failure due to inadequate		Maintenance fail to service the wheels or service the wheels		
8 9	Wheel failure due to inadequate 8 maintenance	AL27B123	Maintenance fail to service the wheels or service the wheels incorrectly	Flaws in aircraft system maintenance process definition - Landing gear components.	37
8 9		AL27B123		Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in maintenance technician / airworthiness specialist requirements definition	
8		AL27B123		Flaws in aircraft system maintenance process definition - Landing gear components.	37 ¹



				precursors and CATS base Events		,
1		Wheel system failure	AL27B124	A malfunction causes the wheels to lock (brake malfunction)	Tire burst	80
2					Contaminated Runway	39
					System failure affecting the operation of primary instruments / displays or standby	
3					instruments	26
4					Wildlife incursion	377
5					Flaws in aircraft system maintenance process definition - Landing gear components.	3//
6					Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
- 0					Maintenance technician / airworthiness specialist tiredness - Inadequate workload	143
7					distribution	150
		 			Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence	130
۰					integrity monitoring	401
٥		+			Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence	401
9					of contaminations.	216
9						210
10					Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	120
10					distribution	129
11					Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130
11		+			process and/or training methodology	130
				Design of any part of the wheel system is inadequate and this	Inadequate certification process and / or flaws in methodology concerning verification	,
1	11	Wheel failure due to inadequate design	AI 27R125	design flaw directly causes the failure of any part of the wheel	of the system / product compliance with requirements - Landing gear components	358
1 +		Whice failure due to madequate design	ALZ/BIZS	design naw directly causes the failure of any part of the wheel	of the system / product compliance with requirements - Landing gear components	1330
	Ш	Flight crew fails to maintain control			Flight crew fails to maintain control	
_		riigite erew ians to maintain control		No input to controls will allow the flight crew to maintain control of		+
1	1	Uncontrollable	AL27B21	the aircraft.	not identifiable at the moment	
2		- Chechicollable	7127521	the district	Tire burst	80
3		 	 	<u> </u>	Contaminated Runway	39
4		1	—	 	Bird strike	34
+		 	 		System failure affecting the operation of primary instruments / displays or standby	+ 34
		1	I		instruments	26
6		 	 	+	Wildlife incursion	5
7		1	—	 	Flaws in aircraft system maintenance process definition - Landing gear components.	377
8		 	 		Flaws in manufacturer quality control process - Landing gear components.	376
0		 	 	+	Flaws in maintenance technician / airworthiness specialist requirements definition	+ "
0		1	I		process and/or training methodology	149
9		 	 		Maintenance technician / airworthiness specialist tiredness - Inadequate workload	145
10		1	I		distribution	150
10		+			uistribution	130
					Inadequate certification process and / or flaws in methodology concerning verification	
11						358
11		+			of the system / product compliance with requirements - Landing gear components	330
12					Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence	40.
12					integrity monitoring	401
					Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence	1
13					of contaminations.	216
					Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction	
14					procedure	162
					Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	
15					distribution	129
					Flaws in vehicle driver / equipment operator / ground agent requirements definition	
16					process and/or training methodology	130
1	1.	Lack of control	AL27B22	The pilot makes no attempt to control the aircraft.	Pilot tiredness - Inadequate workload distribution	167
2					Flaws in pilot requirements definition process and/or training methodology	168
3					Lack of adherence to emergency procedures	448
4					Tire burst	80
5					Contaminated Runway	39
6		ļ			Bird strike	34
_					System failure affecting the operation of primary instruments / displays or standby	l
7		ļ			instruments	26
8					Wildlife incursion	5
9					Flaws in aircraft system maintenance process definition - Landing gear components.	377
10					Flaws in manufacturer quality control process - Landing gear components.	376
					Flaws in maintenance technician / airworthiness specialist requirements definition	
11		1			process and/or training methodology	149
		1	I		Maintenance technician / airworthiness specialist tiredness - Inadequate workload	
12		1			distribution	150
		1	I			
		1	I		Inadequate certification process and / or flaws in methodology concerning verification	
13		1			of the system / product compliance with requirements - Landing gear components	358
		1	I		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence	
14		ļ	-	1	integrity monitoring	401
		1	I		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence	
15			1	1	of contaminations.	216
		1	I		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction	
16			1	1	procedure	162
		1	I		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	
17			1	1	distribution	129
		1	I		Flaws in vehicle driver / equipment operator / ground agent requirements definition	
18			1	<u></u>	process and/or training methodology	130
		1 .	I	The pilot applies incorrect control to the aircraft. This can be due to		
1	1	Incorrect Control	AL27B23	improper training, stress and fatigue	Pilot tiredness - Inadequate workload distribution	167
2		ļ	-	1	Flaws in pilot requirements definition process and/or training methodology	168
3			1	1	Lack of adherence to emergency procedures	448
4		ļ	-	1	Tire burst	80
5		ļ	-	1	Contaminated Runway	39
6			1	1	Bird strike	34
		1			System failure affecting the operation of primary instruments / displays or standby	1
7					instruments	26
8					Wildlife incursion	
_					Flaws in aircraft system maintenance process definition - Landing gear components.	377
9					Flaws in manufacturer quality control process - Landing gear components.	376
9 10					Flaws in maintenance technician / airworthiness specialist requirements definition	1
		I	<u> </u>	<u> </u>	process and/or training methodology	149
					Maintenance technician / airworthiness specialist tiredness - Inadequate workload	T
10					iviaintenance technician / an worthiness specialist theuness - inadequate workload	
10					distribution	150
10						150
10						



П			1	I	Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence	\Box
14					integrity monitoring	401
17					Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence	
15					of contaminations.	216
13					Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction	210
16					procedure	162
10					Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	102
17					distribution	129
1/					Flaws in vehicle driver / equipment operator / ground agent requirements definition	129
18					process and/or training methodology	130
18				The pilot applies correct measures but are not enough to prevent	process and/or training methodology	130
					L	1
1	14	Insufficient control	AL27B24	aircraft leaving off the side of the runway	Pilot tiredness - Inadequate workload distribution	167
2					Flaws in pilot requirements definition process and/or training methodology	168
3					Lack of adherence to emergency procedures	448
4					Tire burst	80
5					Contaminated Runway	39
6					Bird strike	34
					System failure affecting the operation of primary instruments / displays or standby	
7					instruments	26
8					Wildlife incursion	5
9					Flaws in aircraft system maintenance process definition - Landing gear components.	377
10					Flaws in manufacturer quality control process - Landing gear components.	376
П					Flaws in maintenance technician / airworthiness specialist requirements definition	\Box
11					process and/or training methodology	149
П					Maintenance technician / airworthiness specialist tiredness - Inadequate workload	П
12					distribution	150
П						\vdash
					Inadequate certification process and / or flaws in methodology concerning verification	,
13					of the system / product compliance with requirements - Landing gear components	358
-					Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence	+
14					integrity monitoring	401
17					Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence	
15					of contaminations.	216
13			+		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction	210
16					procedure	162
10					Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	162
						420
17					distribution	129
1					Flaws in vehicle driver / equipment operator / ground agent requirements definition	1
18					process and/or training methodology	130



	Base events	Code	Definition	Identifiable precursors	١
ESD1	Base events	Code	Definition	Identifiable precursors	١
1	Aircraft System Failure		F-:	Aircraft System Failure	+
1	Autoflight Failure	TO01B11	Failure of any of the systems associated with the autopilot and auto throttle	System failure affecting the operation of primary instruments / displays or standby instruments	ı
	, incomplic runare	1001011	inotae .	Flaws in maintenance technician / airworthiness specialist requirements definition	t
				process and/or training methodology	
				Maintenance technician / airworthiness specialist tiredness - Inadequate workload	Τ
				distribution	1
				Inadequate certification process and / or flaws in methodology concerning verification	ì
				of the system / product compliance with requirements - FMS subsystems and	ı
				components (autopilot incl.)	+
				Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)	١
				Inadequate certification process and / or flaws in methodology concerning verification	
				of the system / product compliance with requirements - Autothrottle system in the	1
				engine	ı
				Flaws in manufacturer quality control process - Autothrottle system in the engine.	Ť
				Flaws in aircraft system maintenance process definition - Autothrottle system in the	Τ
				engine.	1
				Flaws in aircraft system maintenance process definition - FMS subsystems and	ı
			Failure of any communications equipment such that the crew are	components (autopilot incl.)	+
2	Communications Failure	TO01B12	unable to communicate with ATC	Prolonged loss of communications (PLOC) between pilot and controller(s)	ı
	Communications rundic	TOOIDIZ	diable to communicate with Are	r tolonged loss of communications (i Loc) between pilot and controller(s)	t
				Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll	ı
				Lack of or poor communication quality	Ť
				Flaws in maintenance technician / airworthiness specialist requirements definition	Ť
				process and/or training methodology	⊥
				Maintenance technician / airworthiness specialist tiredness - Inadequate workload	T
				distribution	1
				Flaws in aircraft system maintenance process definition - Communication equipment	ı
		_		systems and components.	4
				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment	1
				systems and components.	ı
				Flaws in manufacturer quality control process - Communication equipment systems	+
				and components.	
			Failure of any of the power supplies such that any critical system	System failure affecting the operation of primary instruments / displays or standby	t
3	Electrical Power Failure	TO01B13	fails	instruments	ı
				Flaws in maintenance technician / airworthiness specialist requirements definition	T
				process and/or training methodology	1
				Maintenance technician / airworthiness specialist tiredness - Inadequate workload	ı
				distribution	4
				Inadequate certification process and / or flaws in methodology concerning verification	ŋ
				of the system / product compliance with requirements - Power supply system components	١
				Flaws in manufacturer quality control process - Power supply system components	t
				Flaws in aircraft system maintenance process definition - Power supply system	t
				components	ı
			Failure of the system designed to warn of and extinguish any fire	System failure affecting the operation of primary instruments / displays or standby	Ť
4	Fire Protection Failure	TO01B14	within the aircraft.	instruments	1
				Flaws in maintenance technician / airworthiness specialist requirements definition	T
				process and/or training methodology	1
				Maintenance technician / airworthiness specialist tiredness - Inadequate workload	l
				distribution	4
				Flaws in aircraft system maintenance process definition - Fire detection system	
				components Inadequate certification process and / or flaws in methodology concerning verification	+
				of the system / product compliance with requirements - Fire deection system	1
				components	
				Flaws in manufacturer quality control process - Fire detection system components	1
				Flaws in aircraft system maintenance process definition - Fire warning system	j
					1
				Inadequate certification process and / or flaws in methodology concerning verification	١
				of the system / product compliance with requirements - Fire warning system	4
		+		Flaws in manufacturer quality control process - Fire warning system	J
				Inadequate certification process and / or flaws in methodology concerning verification	١
				of the system / product compliance with requirements - Fire extinguishing system components	
		+		Flaws in aircraft system maintenance process definition - Fire extinguishing system	H
				components	
					†
				Flaws in manufacturer quality control process - Fire extinguishing system components	J
5	Hydraulic Power Failure	TO01B15	Failure of any of the hydraulic systems	System failure affecting aircraft configuration, controllability and/or flying qualities	1
				Landing gear retraction failure	1
				Flaws in maintenance technician / airworthiness specialist requirements definition	١
		+		process and/or training methodology	4
				Maintenance technician / airworthiness specialist tiredness - Inadequate workload	
		+		distribution	H
				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system	1
				components	
		+	<u> </u>	Flaws in aircraft system maintenance process definition - Hydraulic System	+
		_		Flaws in manufacturer quality control process -Hydraulic system components.	+
					t
	Indicating and Recording System			System failure affecting the operation of primary instruments / displays or standby	
6	Indicating and Recording System Failure	TO01B16	Failure of any of the flight instruments critical for safe flight	System failure affecting the operation of primary instruments / displays or standby instruments	
6		TO01B16	Failure of any of the flight instruments critical for safe flight	instruments Flaws in maintenance technician / airworthiness specialist requirements definition	
6		TO01B16	Failure of any of the flight instruments critical for safe flight	instruments	



	Base events	Code	Definition	Identifiable precursors	No.
4				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - other critical flight instruments and systems.	385
_				Flaws in aircraft system maintenance process definition - other critical flight	
5				instruments and systems. System failure affecting the operation of primary instruments / displays or standby	383
1	7 Navigation System Failure	TO01B17	Failure of any of the navigation systems	instruments	26
2				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
				Maintenance technician / airworthiness specialist tiredness - Inadequate workload	
3				distribution Navigation deviation	317
1				Flaws in aircraft system maintenance process definition - Onboard navigational	131
5				systems and components Inadequate certification process and / or flaws in methodology concerning verification	49:
				of the system / product compliance with requirements - Onboard navigational	
6				systems and components.	492
7				Flaws in manufacturer quality control process - Onboard navigational systems and components.	493
			Failure of a critical part of the APU leading to failure of the APU		
1	8 Auxiliary Power Unit Failure	TO01B18	itself	System failure affecting aircraft configuration, controllability and/or flying qualities Flaws in maintenance technician / airworthiness specialist requirements definition	25
2				process and/or training methodology	149
2				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
1				Inadequate certification process and / or flaws in methodology concerning verification	
				of the system / product compliance with requirements - APU systems and / or	1.0
5				components Flaws in manufacturer quality control process - APU systems and / or components	469
_				Flaws in aircraft system maintenance process definition - APU systems and / or	
1	9 Flap Systems Failure	TO01B19	Failure of flap systems	components System failure affecting aircraft configuration, controllability and/or flying qualities	466
T				Flaws in maintenance technician / airworthiness specialist requirements definition	
2				process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	149
3				distribution	150
				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control	
4				surface system.	288
				Flaws in aircraft system maintenance process definition - Components of Wing control	
5				surface system. Flaws in manufacturer quality control process - Components of Wing control surface	31:
6				system.	314
1	10 Drag Control Systems Failure	TO01B110	Failure of drag control systems	System failure affecting aircraft configuration, controllability and/or flying qualities Flaws in maintenance technician / airworthiness specialist requirements definition	25
2				process and/or training methodology	149
2				Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150
3				distribution Inadequate certification process and / or flaws in methodology concerning verification	150
				of the system / product compliance with requirements - Drag control system	l
4				components. Flaws in aircraft system maintenance process definition - Drag control system	383
5				components.	379
1	11 Landing Gear Systems Failure	TO01B111	Failure of landing gear systems	Flaws in manufacturer quality control process - Drag control system componentss. System failure affecting aircraft configuration, controllability and/or flying qualities	378
2	11 Earlaing Ocar Systems randre	10018111	randic of landing gear systems	Landing gear retraction failure	63
3				Flaws in maintenance technician / airworthiness specialist requirements definition	
3				process and /or training mothodology	
4				process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	149
4				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	149
5				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	150
				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Flaws in aircraft system maintenance process definition - Landing gear components.	149 150 358 377
5 6 7				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	150
7	12 Pneumatic Systems Failure	T001B112	Failure of pneumatic systems	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. System failure affecting the operation of primary instruments / displays or standby instruments	149 150 358 377 376
7	12 Pneumatic Systems Failure	T001B112	Failure of pneumatic systems	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. System failure affecting the operation of primary instruments / displays or standby instruments Engine failure	149 150 358 377 376 26
7 1 2 3	12 Pneumatic Systems Failure	T001B112	Failure of pneumatic systems	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. System failure affecting the operation of primary instruments / displays or standby instruments Engine failure Cabin pressure drop as a result of pneumatic system failure Flaws in maintenance technician / airworthiness specialist requirements definition	149 150 358 377 376 26 77
7 1 2 3	12 Pneumatic Systems Failure	T001B112	Failure of pneumatic systems	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. System failure affecting the operation of primary instruments / displays or standby instruments Engine failure Cabin pressure drop as a result of pneumatic system failure Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149 150 353 37 370 20 7
7 1 2 3 4	12 Pneumatic Systems Failure	T001B112	Failure of pneumatic systems	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. System failure affecting the operation of primary instruments / displays or standby instruments Engine failure Cabin pressure drop as a result of pneumatic system failure Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	144 150 353 377 370 20 77 79
7 1 2 3 4	12 Pneumatic Systems Failure	T001B112	Failure of pneumatic systems	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. System failure affecting the operation of primary instruments / displays or standby instruments Engine failure Cabin pressure drop as a result of pneumatic system failure Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate aircraft de-icing / anti-icing	14! 150 353 377 370 20 77 14! 150
7 1 2 3 4	12 Pneumatic Systems Failure	T001B112	Failure of pneumatic systems	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. System failure affecting the operation of primary instruments / displays or standby instruments Engine failure Cabin pressure drop as a result of pneumatic system failure Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	14! 150 353 377 370 20 77 14! 150
7 1 2 3 4 5 6	12 Pneumatic Systems Failure	T001B112	Failure of pneumatic systems	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. System failure affecting the operation of primary instruments / displays or standby instruments Engine failure Cabin pressure drop as a result of pneumatic system failure Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate aircraft de-icing / anti-icing Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Pneumatic system components.	144 150 353 377 370 20 77 79 144 150 180
7 1 2 3 4 5 6	12 Pneumatic Systems Failure	T001B112	Failure of pneumatic systems	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components. Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. System failure affecting the operation of primary instruments / displays or standby instruments displays or standby instruments Cabin pressure drop as a result of pneumatic system failure Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate aircraft de-icing / anti-icing Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Pneumatic system	14! 150 37: 37: 37: 20: 77: 79: 14! 150: 180: 37!
7 1 2 3 3 4 5 6	12 Pneumatic Systems Failure	T001B112	Failure of pneumatic systems	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. System failure affecting the operation of primary instruments / displays or standby instruments Engine failure Cabin pressure drop as a result of pneumatic system failure Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate aircraft de-icing / anti-icing Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Pneumatic system components. Flaws in aircraft system maintenance process definition - Pneumatic system components. Flaws in manufacturer quality control process - Pneumatic system components.	145 156 377 370 20 77 75 145 186 375 375
7 1 2 3 3 4 4 5 6 6				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components. Flaws in aircraft system maintenance process definition - Landing gear components. System failure affecting the operation of primary instruments / displays or standby instruments [Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate aircraft de-icing / anti-icing Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Pneumatic system components. Flaws in aircraft system maintenance process definition - Pneumatic system components.	14! 150 353 377 20 77 14! 150 379 379 379 379 379 379
7 1 2 3 3 4 4 5 6 6	12 Pneumatic Systems Failure 13 Door Systems Failure	T001B112	Failure of pneumatic systems Failure of door systems	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. System failure affecting the operation of primary instruments / displays or standby instruments displays or standby instruments Engine failure Cabin pressure drop as a result of pneumatic system failure Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate aircraft de-icing / anti-icing Inadequate aircraft de-icing / anti-icing Inadequate aircraft de-icing / anti-icing Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Pneumatic system components. Flaws in aircraft system maintenance process definition - Pneumatic system components. Flaws in manufacturer quality control process - Pneumatic system componentss. Flaws in manufacturer quality control process - Pneumatic system components. Flaws in maintenance technician / airworthiness specialist requirements definition Flaws in maintenance technician / airworthiness specialist requirements definition Flaws in maintenance technician / airworthiness specialist requirements definition Flaws in maintenance technician / airworthiness specialist requirements definition Flaws in maintenance technician / airworthiness specialist requirements definition	144 150 37 144 150 37 180 37 37 22 25 25 25 25 25 25 25 25 25 25 25 25
7 1 2 3 4 4 5 6 6				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. System failure affecting the operation of primary instruments / displays or standby instruments Engine failure Cabin pressure drop as a result of pneumatic system failure Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate aircraft de-icing / anti-icing Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Pneumatic system components. Flaws in aircraft system maintenance process definition - Pneumatic system components. Flaws in manufacturer quality control process - Pneumatic system componentss. System failure affecting the operation of primary instruments / displays or standby instruments Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149 150 370 370 20 77 79 149 150 180 371 371 371 371 371 371 371 371
7 1 2 3 3 4 5 6 7 8 9				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. System failure affecting the operation of primary instruments / displays or standby instruments displays or standby instruments Engine failure Cabin pressure drop as a result of pneumatic system failure Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate aircraft de-icing / anti-icing Inadequate aircraft de-icing / anti-icing Inadequate aircraft de-icing / anti-icing Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Pneumatic system components. Flaws in aircraft system maintenance process definition - Pneumatic system components. Flaws in manufacturer quality control process - Pneumatic system componentss. Flaws in manufacturer quality control process - Pneumatic system components. Flaws in maintenance technician / airworthiness specialist requirements definition Flaws in maintenance technician / airworthiness specialist requirements definition Flaws in maintenance technician / airworthiness specialist requirements definition Flaws in maintenance technician / airworthiness specialist requirements definition Flaws in maintenance technician / airworthiness specialist requirements definition	14! 150 351 377 20 77 79 14! 37! 37! 37!
7 1 2 3 4 5 6				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. System failure affecting the operation of primary instruments / displays or standby instruments Engine failure Cabin pressure drop as a result of pneumatic system failure Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate aircraft de-icing / anti-icing Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Pneumatic system components. Flaws in aircraft system maintenance process definition - Pneumatic system components. Flaws in manufacturer quality control process - Pneumatic system components. System failure affecting the operation of primary instruments / displays or standby instruments Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification inadequate certification process and / or flaws in methodology concerning verification inadequate certification process and / or flaws in methodology concerning verification inadequate certification process and / or flaws in methodology concerning verification inadequate certification process and / or flaws in methodology concerning verification inadequate certification process and / or flaws in methodology concerning verification in methodology concern	149 150 358 377 376 26 77 79 149 150 180 379 374 377 377 377 377 377 377 377 377 377
7 1 2 3 4 5 6 7 8 9 1				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. System failure affecting the operation of primary instruments / displays or standby instruments displays or standby instruments Engine failure Cabin pressure drop as a result of pneumatic system failure Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate aircraft de-icing / anti-icing Inadequate aircraft de-icing / anti-icing Inadequate aircraft de-icing / anti-icing Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Pneumatic system components. Flaws in aircraft system maintenance process definition - Pneumatic system components. Flaws in manufacturer quality control process - Pneumatic system componentss. Flaws in manufacturer quality control process - Pneumatic system componentss. Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	149 150 358 377 376 26 77 79 149 150 180 379 374 377 377 377 377 377 377 377 377 377
7 1 2 3 4 5 6 6 7 8 8 9				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. System failure affecting the operation of primary instruments / displays or standby instruments Engine failure Cabin pressure drop as a result of pneumatic system failure Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate aircraft de-icing / anti-icing Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Pneumatic system components. Flaws in aircraft system maintenance process definition - Pneumatic system components. Flaws in manufacturer quality control process - Pneumatic system components. System failure affecting the operation of primary instruments / displays or standby instruments Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or	149 150 358 377 376 26 77 79 149 150 379 379 379 379 379 379 379 379 379 379



4 4	Base events	Code	Definition		No.
1 1	4 Other Systems Failures	TO01B114	Failure of other systems that may cause take-off rejection	System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby	25
2				instruments	26
					Т
3				Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll	98
				Flaws in maintenance technician / airworthiness specialist requirements definition	
4				process and/or training methodology	149
				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
3	+			Inadequate certification process and / or flaws in methodology concerning verification	
				of the system / product compliance with requirements - other critical flight	
6				instruments and systems.	385
	1			Flaws in aircraft system maintenance process definition - other critical flight	
7				instruments and systems.	383
I +					
II	Take-off Rejection by Flight Crew			Take-off Rejection by Flight Crew	╙
			The pilot either fails to realise the failure or diagnoses the failure as		
1 1	.5 Pilot Misdiagnosis	TO01B211	something else, perhaps more serious and as a result aborts the take-off	Pilot tiredness - Inadequate workload distribution	167
2	5 FILOT WIISUIAGIIOSIS	1001B211	take-oii	Flaws in pilot requirements definition process and/or training methodology	168
3				Poor application of T/O & RTO procedure, failure recognition and preparedness	209
4				System failure affecting aircraft configuration, controllability and/or flying qualities	25
				System failure affecting the operation of primary instruments / displays or standby	Г
5				instruments	26
6	1			Prolonged loss of communications (PLOC) between pilot and controller(s)	53
7	+			Landing gear retraction failure	63
9				Engine failure Cabin procesure drop as a result of programatic system failure	79
9	+		+	Cabin pressure drop as a result of pneumatic system failure	<u> </u>
10	1			Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll	98
11	+		+	Lack of or poor communication quality	146
				Flaws in maintenance technician / airworthiness specialist requirements definition	Ė
12	<u> </u>			process and/or training methodology	149
T				Maintenance technician / airworthiness specialist tiredness - Inadequate workload	
13				distribution	150
14				Inadequate aircraft de-icing / anti-icing	180
				Inadequate certification process and / or flaws in methodology concerning verification	
15				of the system / product compliance with requirements - Power supply system components	230
16	+	_		Flaws in manufacturer quality control process - Power supply system components	238
10	+			Flaws in aircraft system maintenance process definition - Communication equipment	230
17				systems and components.	270
	†			Inadequate certification process and / or flaws in methodology concerning verification	\vdash
				of the system / product compliance with requirements - Communication equipment	
18				systems and components.	273
				Flaws in manufacturer quality control process - Communication equipment systems	
19				and components.	272
				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control	
20				surface system.	288
20	+	+		Inadequate certification process and / or flaws in methodology concerning verification	
				of the system / product compliance with requirements - FMS subsystems and	
21				components (autopilot incl.)	299
				Flaws in manufacturer quality control process - FMS subsystem and components	Г
22				(autopilot incl.)	306
				Flaws in aircraft system maintenance process definition - Components of Wing control	
23				surface system.	31:
24				Flaws in manufacturer quality control process - Components of Wing control surface system.	21
24	+	_		Inadequate certification process and / or flaws in methodology concerning verification	314
	1			of the system / product compliance with requirements - Autothrottle system in the	
25				engine	316
26				Navigation deviation	317
27				Flaws in manufacturer quality control process - Autothrottle system in the engine.	324
	1			Flaws in aircraft system maintenance process definition - Autothrottle system in the	
28	1			engine.	325
	1			Inadequate certification process and / or flaws in methodology concerning verification	
20				of the system / product compliance with requirements - Hydraulic system	25
29 30				components Flaws in aircraft system maintenance process definition - Hydraulic System	333
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of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) Plaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.) Blaws in aircraft system maintenance process definition - Components of Wing control surface system. Blaws in aircraft system quality control process - Components of Wing control surface system. Blaws in amnufacturer quality control process - Components of Wing control surface system. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine Mavigation deviation Flaws in manufacturer quality control process - Autothrottle system in the engine 1316 Ravigation deviation Flaws in manufacturer quality control process - Autothrottle system in the engine 316 Ravigation deviation Flaws in manufacturer quality control process - Autothrottle system in the engine 317 Flaws in manufacturer quality control process - Autothrottle system in the engine	5 6 7 8 9 10 11 12 13 14 15 16 17				System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby instruments Prolonged loss of communications (PLOC) between pilot and controller(s) Landing gear retraction failure Engine failure Cabin pressure drop as a result of pneumatic system failure Other cockpit effects / maifunctions (genuine or spurious) occurring during takeoff roll Lack of or poor communication quality Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution inadequate aircraft de-icing / anti-icing inadequate aircraft de-icing / anti-icing inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components Flaws in manufacturer quality control process - Power supply system components Flaws in aircraft system maintenance process definition - Communication equipment systems and components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components. Flaws in manufacturer quality control process - Communication equipment systems and components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control of the system / product compliance with requirements - Components of Wing control	25 26 53 63 77 79 98 146 149 150 180 230 238 270 271
Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.) 23 Flaws in aircraft system maintenance process definition - Components of Wing control surface system. 311 Flaws in manufacturer quality control process - Components of Wing control surface system. 312 313 Flaws in manufacturer quality control process - Components of Wing control surface system. 314 Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine 316 Navigation deviation Flaws in manufacturer quality control process - Autothrottle system in the engine 317 Flaws in manufacturer quality control process - Autothrottle system in the engine 324 Flaws in aircraft system maintenance process definition - Autothrottle system in the	5 6 7 8 9 10 11 12 13 14 15 16 17				System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby instruments Prolonged loss of communications (PLOC) between pilot and controller(s) Landing gear retraction failure Engine failure Cabin pressure drop as a result of pneumatic system failure Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll Lack of or poor communication quality Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate aircraft de-icing / anti-icing Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components Flaws in manufacturer quality control process - Power supply system components Flaws in aircraft system maintenance process definition - Communication equipment systems and components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control of the system / product compliance with requirements - Components of Wing control of the system / product compliance with requirements - Components of Wing control of the system.	25 26 53 63 77 79 98 146 149 150 180 230 238 270 271 272
Flaws in aircraft system maintenance process definition - Components of Wing control surface system. 24 Flaws in manufacturer quality control process - Components of Wing control surface system. 25 Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine engine 26 Navigation deviation 27 Flaws in manufacturer quality control process - Autothrottle system in the engine. 316 Flaws in aircraft system maintenance process definition - Autothrottle system in the engine. 327 Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.	5 6 7 8 9 10 11 12 13 14 15 16 17				System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby instruments Prolonged loss of communications (PLOC) between pilot and controller(s) Landing gear retraction failure Engine failure Cabin pressure drop as a result of pneumatic system failure Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll Lack of or poor communication quality Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist riedness - Inadequate workload distribution Inadequate aircraft de-icing / anti-icing Inadequate aircraft de-icing / anti-icing Inadequate aircraft de-icing / anti-icing Inadequate aircraft dericing / anti-icing Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components Flaws in manufacturer quality control process - Power supply system components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components. Flaws in manufacturer quality control process - Communication equipment systems and components. Flaws in manufacturer quality control process - Communication equipment systems and components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and of the system / product compliance with requirements - FMS subsystems and	25 26 53 63 77 79 98 146 149 150 230 238 270 271
24 system. 314 Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine 316 25 8 8 8 8 8 8 9 9 9 9 9 9 9 9 9 9 9 9 9	5 6 7 8 9 10 11 12 13 14 15 16 17				System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby instruments Prolonged loss of communications (PLOC) between pilot and controller(s) Landing gear retraction failure Engine failure Cabin pressure drop as a result of pneumatic system failure Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll Lack of or poor communication quality Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate aircraft de-icing / anti-icing Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components Flaws in aircraft system maintenance process definition - Communication equipment systems and components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components. Flaws in manufacturer quality control process - Communication equipment systems and components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components.	25 26 53 63 77 79 98 146 149 150 180 230 238 270 271 272 288
of the system / product compliance with requirements - Autothrottle system in the engine 316 Navigation deviation 317 Flaws in manufacturer quality control process - Autothrottle system in the engine. 324 Flaws in aircraft system maintenance process definition - Autothrottle system in the	5 6 7 8 9 10 11 12 13 14 15 16 17 18 19				System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby instruments Prolonged loss of communications (PLOC) between pilot and controller(s) Landing gear retraction failure Cabin pressure drop as a result of pneumatic system failure Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll Lack of or poor communication quality Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution inadequate aircraft de-icing / anti-icing linadequate aircraft de-icing / anti-icing linadequate aircraft system maintenance with requirements - Power supply system components Flaws in manufacturer quality control process - Power supply system components Flaws in aircraft system maintenance process definition - Communication equipment systems and components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control of the system / product compliance with requirements - Components of Wing control of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) Flaws in maircraft system maintenance process - FMS subsystem and components (autopilot incl.)	25 26 53 63 77 79 98 146 149 150 180 238 270 271 272 288 299
26 Navigation deviation 317 27 Flaws in manufacturer quality control process - Autothrottle system in the engine. 324 Flaws in aircraft system maintenance process definition - Autothrottle system in the 324	5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22				System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby instruments Prolonged loss of communications (PLOC) between pilot and controller(s) Landing gear retraction failure Cabin pressure drop as a result of pneumatic system failure Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll Lack of or poor communication quality Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution inadequate aircraft de-icing / anti-icing linadequate aircraft de-icing / anti-icing linadequate ecrification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components Flaws in manufacturer quality control process - Power supply system components Flaws in aircraft system maintenance process definition - Communication equipment systems and components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.) Flaws in manufacturer quality control process - FMS subsystem and components (a	25 26 53 63 77 79 98 146 149 150 180 230 271 272 288 299 306 311 314
27 Flaws in manufacturer quality control process - Autothrottle system in the engine. 324 Flaws in aircraft system maintenance process definition - Autothrottle system in the	5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24				System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby instruments Prolonged loss of communications (PLOC) between pilot and controller(s) Landing gear retraction failure Engine failure Cabin pressure drop as a result of pneumatic system failure Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll Lack of or poor communication quality Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate aircraft de-icing / anti-icing Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components Flaws in manufacturer quality control process - Power supply system components Flaws in aircraft system maintenance process definition - Communication equipment systems and components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components. Flaws in manufacturer quality control process - Communication equipment systems and components. Flaws in manufacturer quality control process - Communication equipment systems and components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) Flaws in manufacturer quality control process - FMS subsystem and components [autopilot incl.) Flaws in manufacturer quality control process - FMS subsystem and components in aircraft	25 26 53 63 77 79 98 146 149 150 230 271 272 288 299 306 311
	5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24				System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby instruments Prolonged loss of communications (PLOC) between pilot and controller(s) Landing gear retraction failure Cabin pressure drop as a result of pneumatic system failure Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll Lack of or poor communication quality Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution inadequate aircraft de-icing / anti-icing linadequate aircraft de-icing / anti-icing linadequate aircraft product compliance with requirements - Power supply system components Flaws in manufacturer quality control process - Power supply system components Flaws in aircraft system maintenance process definition - Communication equipment systems and components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) Flaws in manufacturer quality control process - FMS subsystem and components flaws in manufacturer quality control process - FMS subsystem and components flaws in manufacturer quality control process - FMS subsystem and components flaws in manu	25 26 53 63 77 79 98 146 149 150 180 230 271 272 288 299 306 311 314
	5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24				System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby instruments prolonged loss of communications (PLOC) between pilot and controller(s) Landing gear retraction failure fingine failure Cabin pressure drop as a result of pneumatic system failure Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll Lack of or poor communication quality Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate aircraft de-icing / anti-icing Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components Flaws in manufacturer quality control process - Power supply system components Flaws in aircraft system maintenance process definition - Communication equipment systems and components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components. Flaws in manufacturer quality control process - Communication equipment systems and components. Flaws in manufacturer quality control process - Communication equipment systems and components. Flaws in manufacturer quality control process - FMS subsystem and components (sutopilot incl.) Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.) Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.) Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.) Flaws in manufacturer quality control process - FMS subsystem and components of Wing control surface system.	25 26 53 63 77 79 98 146 149 150 230 230 271 272 288 299 306 311 314



		Base events	Code	Definition		No.
					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system	
29					components	333
30					Flaws in aircraft system maintenance process definition - Hydraulic System	334
					Inadequate certification process and / or flaws in methodology concerning verification	
31					of the system / product compliance with requirements - Landing gear components	358
32					Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)	410
32					Inadequate certification process and / or flaws in methodology concerning verification	410
					of the system / product compliance with requirements - APU systems and / or	
33					components Flaws in aircraft system maintenance process definition - APU systems and / or	464
34					components	466
					Flaws in aircraft system maintenance process definition - Fire detection system	
35	_				components Inadequate certification process and / or flaws in methodology concerning verification	474
					of the system / product compliance with requirements - Fire deection system	
36					components	475
37 38					Flaws in manufacturer quality control process - Fire detection system components Flaws in aircraft system maintenance process definition - Fire warning system	476 477
					8-7	
20					Inadequate certification process and / or flaws in methodology concerning verification	478
39 40					of the system / product compliance with requirements - Fire warning system Flaws in manufacturer quality control process - Fire warning system	478
Ħ					Inadequate certification process and / or flaws in methodology concerning verification	M
44					of the system / product compliance with requirements - Fire extinguishing system	400
41					components Flaws in aircraft system maintenance process definition - Fire extinguishing system	480
42					components	481
12					Flaws in manufacturar quality control process. Fire optinguishing system con-	482
43					Flaws in manufacturer quality control process - Fire extinguishing system components Flaws in aircraft system maintenance process definition - Onboard navigational	+62
44					systems and components	491
					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational	
45					systems and components.	492
					Flaws in manufacturer quality control process - Onboard navigational systems and	
46					components. Inadequate certification process and / or flaws in methodology concerning verification	493
					of the system / product compliance with requirements - Aircraft door system and / or	
47					components	391
					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or	
49					components	391
					Flaws in aircraft system maintenance process definition - Power supply system	
50 51					components Flaws in manufacturer quality control process -Hydraulic system components.	387 386
31					Inadequate certification process and / or flaws in methodology concerning verification	300
					of the system / product compliance with requirements - other critical flight	205
52					instruments and systems. Flaws in aircraft system maintenance process definition - other critical flight	385
53					instruments and systems.	383
					Inadequate certification process and / or flaws in methodology concerning verification	
55					of the system / product compliance with requirements - Drag control system components.	381
					Flaws in aircraft system maintenance process definition - Drag control system	
56 57					components. Flaws in manufacturer quality control process - Drag control system componentss.	379 378
58					Flaws in aircraft system maintenance process definition - Landing gear components.	377
59					Flaws in manufacturer quality control process - Landing gear components.	376
					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Pneumatic system	
60					components.	375
					Flaws in aircraft system maintenance process definition - Pneumatic system	
61 62	-				components. Flaws in manufacturer quality control process - Pneumatic system componentss.	374 373
				If the take-off is rejected when the aircraft is below V1 then this is a		
		Take-off rejected correctly when below	T001022	success, but it must be included to obtain the pivotal event	not identifiable at that level	
2	17	V I	TO01B22	probability	not identifiable at that level System failure affecting aircraft configuration, controllability and/or flying qualities	25
					System failure affecting the operation of primary instruments / displays or standby	
П						
3					instruments	26 53
						26 53 63
3 4 5 6					instruments Prolonged loss of communications (PLOC) between pilot and controller(s) Landing gear retraction failure Engine failure	53 63 77
3 4 5					instruments Prolonged loss of communications (PLOC) between pilot and controller(s) Landing gear retraction failure	53 63
3 4 5 6					instruments Prolonged loss of communications (PLOC) between pilot and controller(s) Landing gear retraction failure Engine failure	53 63 77 79
3 4 5 6					instruments Prolonged loss of communications (PLOC) between pilot and controller(s) Landing gear retraction failure Engine failure Cabin pressure drop as a result of pneumatic system failure Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll Lack of or poor communication quality	53 63 77 79
3 4 5 6 7 8					Instruments Prolonged loss of communications (PLOC) between pilot and controller(s) Landing gear retraction failure Engine failure Cabin pressure drop as a result of pneumatic system failure Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll Lack of or poor communication quality Flaws in maintenance technician / airworthiness specialist requirements definition	53 63 77 79 98 146
3 4 5 6 7					instruments Prolonged loss of communications (PLOC) between pilot and controller(s) Landing gear retraction failure Engine failure Cabin pressure drop as a result of pneumatic system failure Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll Lack of or poor communication quality	53 63 77 79 98
3 4 5 6 7 8 9					Instruments Prolonged loss of communications (PLOC) between pilot and controller(s) Landing gear retraction failure Engine failure Cabin pressure drop as a result of pneumatic system failure Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll Lack of or poor communication quality Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	53 63 77 79 98 146 149
3 4 5 6 7 8 9					Instruments Prolonged loss of communications (PLOC) between pilot and controller(s) Landing gear retraction failure Engine failure Cabin pressure drop as a result of pneumatic system failure Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll Lack of or poor communication quality Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate aircraft de-icing / anti-icing	53 63 77 79 98 146
3 4 5 6 7 8 9					Instruments Prolonged loss of communications (PLOC) between pilot and controller(s) Landing gear retraction failure Engine failure Cabin pressure drop as a result of pneumatic system failure Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll Lack of or poor communication quality Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	53 63 77 79 98 146 149
3 4 5 6 7 8 9 10 11 12					Instruments Prolonged loss of communications (PLOC) between pilot and controller(s) Landing gear retraction failure Engine failure Cabin pressure drop as a result of pneumatic system failure Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll Lack of or poor communication quality Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate aircraft de-icing / anti-icing Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components	53 63 77 79 98 146 149 150 180
3 4 5 6 7 8 9 10					Instruments Prolonged loss of communications (PLOC) between pilot and controller(s) Landing gear retraction failure Engine failure Cabin pressure drop as a result of pneumatic system failure Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll Lack of or poor communication quality Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate aircraft de-icing / anti-icing Inadequate certification process and/ or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system	53 63 77 79 98 146 149 150 180



	Base events	Code	Definition	Identifiable precursors	No.
16				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.	271
				Flaws in manufacturer quality control process - Communication equipment systems	
17				and components. Inadequate certification process and / or flaws in methodology concerning verification	272
18				of the system / product compliance with requirements - Components of Wing control surface system.	288
10				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and	299
19				components (autopilot incl.) Flaws in manufacturer quality control process - FMS subsystem and components	299
20				(autopilot incl.) Flaws in aircraft system maintenance process definition - Components of Wing control	306
21				surface system.	311
22				Flaws in manufacturer quality control process - Components of Wing control surface system.	314
				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the	
23 24				engine Navigation deviation	316 317
25				Flaws in manufacturer quality control process - Autothrottle system in the engine.	324
26				Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.	325
				Inadequate certification process and / or flaws in methodology concerning verification	
27				of the system / product compliance with requirements - Hydraulic system components	333
28				Flaws in aircraft system maintenance process definition - Hydraulic System	334
				Inadequate certification process and / or flaws in methodology concerning verification	1
29				of the system / product compliance with requirements - Landing gear components Flaws in aircraft system maintenance process definition - FMS subsystems and	358
30				components (autopilot incl.)	410
				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or	1
31				components Flaws in aircraft system maintenance process definition - APU systems and / or	464
32				components	466
33				Flaws in aircraft system maintenance process definition - Fire detection system components	474
				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system	
34				components	475
35 36				Flaws in manufacturer quality control process - Fire detection system components Flaws in aircraft system maintenance process definition - Fire warning system	476 477
37				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system	478
38				Flaws in manufacturer quality control process - Fire warning system Inadequate certification process and / or flaws in methodology concerning verification	479
39				of the system / product compliance with requirements - Fire extinguishing system components	480
				Flaws in aircraft system maintenance process definition - Fire extinguishing system	
40				components	481
41				Flaws in manufacturer quality control process - Fire extinguishing system components Flaws in aircraft system maintenance process definition - Onboard navigational	482
42				systems and components	491
40				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational	
43				systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and	492
44				components. Inadequate certification process and / or flaws in methodology concerning verification	493
45				of the system / product compliance with requirements - Aircraft door system and / or components	391
				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or	
47				components Flaws in aircraft system maintenance process definition - Power supply system	391
48				components	387
49				Flaws in manufacturer quality control process -Hydraulic system components. Inadequate certification process and / or flaws in methodology concerning verification	386 1
50				of the system / product compliance with requirements - other critical flight instruments and systems.	385
51				Flaws in aircraft system maintenance process definition - other critical flight instruments and systems.	383
31				Inadequate certification process and / or flaws in methodology concerning verification	
53				of the system / product compliance with requirements - Drag control system components.	381
				Flaws in aircraft system maintenance process definition - Drag control system components.	379
54				Flaws in manufacturer quality control process - Drag control system componentss.	378
54 55		1		Flaws in aircraft system maintenance process definition - Landing gear components.	377 376
55 56		+		Flaws in manufacturer quality control process - Landing gear components	
55				Flaws in manufacturer quality control process - Landing gear components. Inadequate certification process and / or flaws in methodology concerning verification	
55 56					
55 56 57				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Pneumatic system	ı



_	- 1	Base events	Code	Definition	Identifiable precursors	No
11						
- II - II - II		Failure to Achieve Maximum Braking			Failure to Achieve Maximum Braking	
Τ		andre to Acineve Waximum Braking		The runway can be too short under wet or icy runway conditions for	Funde to senieve maximum braking	t
1	10 1	nsufficient Runway Length	TO01B31	the plane to come to a halt even if the take-off is aborted before V1 is reached	Convective weather - heavy rain resulted with wet RWY surface	١,
2	101	ilsuilicient kunway tengtii	1001631	is reactieu	Pilot tiredness - Inadequate workload distribution	10
3					Flaws in pilot requirements definition process and/or training methodology	10
4					Gross error in takeoff weight entry and/or in V1 / VR speeds assessment Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of	1
					RWY surface condition. Snow / ice presence / or runway surface friction rate below	
5					minimum	20
6					High energy RTO rate is an indicator of improper Operator's policy for T/O operations.	. 2:
7					Poor application of T/O & RTO procedure, computation of T/O parameters	2
8					System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby	H
9					instruments	
.0					Prolonged loss of communications (PLOC) between pilot and controller(s)	Ŧ
2					Landing gear retraction failure Engine failure	+
3					Cabin pressure drop as a result of pneumatic system failure	I
4					Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll	11
5					Lack of or poor communication quality	1
Τ					Flaws in maintenance technician / airworthiness specialist requirements definition	Τ.
.6	-		-		process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	1
7					distribution	1
8	-1				Inadequate aircraft de-icing / anti-icing Inadequate certification process and / or flaws in methodology concerning verification	1
					of the system / product compliance with requirements - Power supply system	1
9					components	2
0					Flaws in manufacturer quality control process - Power supply system components Flaws in aircraft system maintenance process definition - Communication equipment	1
1					systems and components.	12
T					Inadequate certification process and / or flaws in methodology concerning verification	١
2					of the system / product compliance with requirements - Communication equipment systems and components.	1
Ť					Flaws in manufacturer quality control process - Communication equipment systems	Ť
3					and components.	1
					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control	
4					surface system.	2
					Inadequate certification process and / or flaws in methodology concerning verification	1
25					of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	2
Ť					Flaws in manufacturer quality control process - FMS subsystem and components	T
6					(autopilot incl.) Flaws in aircraft system maintenance process definition - Components of Wing control	3
7					surface system.	. 3
8					Flaws in manufacturer quality control process - Components of Wing control surface	3
8					system. Inadequate certification process and / or flaws in methodology concerning verification	
					of the system / product compliance with requirements - Autothrottle system in the	
9 0					engine Navigation deviation	3
1					Flaws in manufacturer quality control process - Autothrottle system in the engine.	1
Т					Flaws in aircraft system maintenance process definition - Autothrottle system in the	Т
2	-				engine. Inadequate certification process and / or flaws in methodology concerning verification	1
					of the system / product compliance with requirements - Hydraulic system	1
3 4					components	1
4					Flaws in aircraft system maintenance process definition - Hydraulic System	Ŧ
ı					Inadequate certification process and / or flaws in methodology concerning verification	1
5					of the system / product compliance with requirements - Landing gear components	- 3
5					Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)	١.
Ť					Inadequate certification process and / or flaws in methodology concerning verification	
7	- 1				of the system / product compliance with requirements - APU systems and / or components	١.
Ť					Flaws in aircraft system maintenance process definition - APU systems and / or	+
3					components	1
					Flaws in aircraft system maintenance process definition - Fire detection system components	
t	1				Inadequate certification process and / or flaws in methodology concerning verification	
					of the system / product compliance with requirements - Fire deection system	
-	-				components Flaws in manufacturer quality control process - Fire detection system components	+
2					Flaws in aircraft system maintenance process definition - Fire warning system	t
Γ						Τ
3	- 1				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system	n .
4	+				Flaws in manufacturer quality control process - Fire warning system	4
T					Inadequate certification process and / or flaws in methodology concerning verification	١
15	- 1				of the system / product compliance with requirements - Fire extinguishing system components	_
7	_		 		Flaws in aircraft system maintenance process definition - Fire extinguishing system	۲



		Base events	Code	Definition	Identifiable precursors	No.
47					Flaws in manufacturer quality control process - Fire extinguishing system components	482
48					Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491
40					Inadequate certification process and / or flaws in methodology concerning verification	491
49					of the system / product compliance with requirements - Onboard navigational systems and components.	492
П					Flaws in manufacturer quality control process - Onboard navigational systems and	
50					components. Inadequate certification process and / or flaws in methodology concerning verification	493
					of the system / product compliance with requirements - Aircraft door system and / or	201
51					components Inadequate certification process and / or flaws in methodology concerning verification	391
53					of the system / product compliance with requirements - Aircraft door system and / or components	391
П					Flaws in aircraft system maintenance process definition - Power supply system	
54 55					components Flaws in manufacturer quality control process -Hydraulic system components.	387 386
					Inadequate certification process and / or flaws in methodology concerning verification	
56					of the system / product compliance with requirements - other critical flight instruments and systems.	385
П					Flaws in aircraft system maintenance process definition - other critical flight	
57					instruments and systems. Inadequate certification process and / or flaws in methodology concerning verification	383
50					of the system / product compliance with requirements - Drag control system	381
59					components. Flaws in aircraft system maintenance process definition - Drag control system	
60 61					components. Flaws in manufacturer quality control process - Drag control system componentss.	379 378
62					Flaws in aircraft system maintenance process definition - Landing gear components.	377
63					Flaws in manufacturer quality control process - Landing gear components. Inadequate certification process and / or flaws in methodology concerning verification	376
					of the system / product compliance with requirements - Pneumatic system	
64			-		components. Flaws in aircraft system maintenance process definition - Pneumatic system	375
65					components.	374
66 67					Flaws in manufacturer quality control process - Pneumatic system componentss. Pilot tiredness - Inadequate workload distribution	373 167
68					Flaws in pilot requirements definition process and/or training methodology	168
69					Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207
70					Poor application of T/O & RTO procedure, failure recognition and preparedness	209
1	19	Brakes not functioning correctly	TO01B32	The braking systems are improperly maintained or damaged during the take-off roll	System failure affecting aircraft configuration, controllability and/or flying qualities	25
2		,			Contaminated Runway	39
3					Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
4					Maintenance technician / airworthiness specialist tiredness - Inadequate workload	
4						450
5					distribution Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence	150
6					Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.	150 216
					Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence	
7					Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake). System failure affecting aircraft configuration, controllability and/or flying qualities	216
8					Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake). System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby instruments	216 366 25 26
8					Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxing control related system and components (incl. brake). System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby instruments Prolonged loss of communications (PLOC) between pilot and controller(s)	216 366 25 26 53
8 9 10 11					Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake). System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting aircraft configuration of primary instruments / displays or standby instruments Prolonged loss of communications (PLOC) between pilot and controller(s) Landing gear retraction failure Engine failure	216 366 25 26 53 63 77
8 9 10					Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake). System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby instruments Prolonged loss of communications (PLOC) between pilot and controller(s) Landing gear retraction failure	216 366 25 26 53 63
8 9 10 11 12					Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake). System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby instruments Prolonged loss of communications (PLOC) between pilot and controller(s) Landing gear retraction failure Engine failure Cabin pressure drop as a result of pneumatic system failure Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll	216 366 25 26 53 63 77 79 98
8 9 10 11 12					Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake). System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby instruments Prolonged loss of communications (PLOC) between pilot and controller(s) Landing gear retraction failure Engine failure Cabin pressure drop as a result of pneumatic system failure	216 366 25 26 53 63 77 79
8 9 10 11 12					Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake). System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby instruments Prolonged loss of communications (PLOC) between pilot and controller(s) Landing gear retraction failure Engine failure Cabin pressure drop as a result of pneumatic system failure Other cockpit effects / maifunctions (genuine or spurious) occurring during takeoff roll Lack of or poor communication quality Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	216 366 25 26 53 63 77 79 98
8 9 10 11 12 13					Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxing control related system and components (incl. brake). System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby instruments Prolonged loss of communications (PLOC) between pilot and controller(s) Landing gear retraction failure Engine failure Cabin pressure drop as a result of pneumatic system failure Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll Lack of or poor communication quality Flaws in maintenance technician / airworthiness specialist requirements definition	216 366 25 26 53 63 77 79 98 146
8 9 10 11 12 13 14					Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake). System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby instruments Prolonged loss of communications (PLOC) between pilot and controller(s) Landing gear retraction failure Engine failure Cabin pressure drop as a result of pneumatic system failure Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll Lack of or poor communication quality Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	216 366 25 26 53 63 77 79 98 146
8 9 10 11 12 13 14 15					Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxing control related system and components (incl. brake). System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby instruments Prolonged loss of communications (PLOC) between pilot and controller(s) Landing gear retraction failure Engine failure Cabin pressure drop as a result of pneumatic system failure Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll Lack of or poor communication quality Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - inadequate workload distribution	216 366 25 26 53 63 77 79 98 146 149
8 9 10 11 12 13 14 15 16 17					Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake). System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby instruments Prolonged loss of communications (PLOC) between pilot and controller(s) Landing gear retraction failure Cabin pressure drop as a result of pneumatic system failure Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll Lack of or poor communication quality Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution inadequate aircraft de-icing / anti-icing inadequate aircraft de-icing / anti-icing inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components	216 366 25 26 53 63 77 79 98 146 149 150 180
8 9 10 11 12 13 14 15 16 17 18					Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake). System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby instruments Prolonged loss of communications (PLOC) between pilot and controller(s) Landing gear retraction failure Engine failure Cabin pressure drop as a result of pneumatic system failure Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll Lack of or poor communication quality Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate aircraft de-icing / anti-icing Inadequate aircraft de-icing / anti-icing Inadequate aircraft de-icing / anti-icing Flaws in maintenance requality control process - Power supply system components Flaws in manufacturer quality control process - Power supply system components Flaws in manufacturer quality control process definition - Communication equipment	216 366 25 26 53 77 79 98 146 149 150 180 230 238
8 9 10 11 12 13 14 15 16 17 18					Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxing control related system and components (incl. brake). System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby instruments Prolonged loss of communications (PLOC) between pilot and controller(s) Landing gear retraction failure Cabin pressure drop as a result of pneumatic system failure Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll Lack of or poor communication quality Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution inadequate aircraft de-icing / anti-icing inadequate aircraft de-icing / anti-icing inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components Flaws in manufacturer quality control process - Power supply system components Flaws in manufacturer quality control process definition - Communication equipment systems and components.	216 366 25 26 53 63 77 79 98 146 149 150 180
8 9 10 11 12 13 14 15 16 17 18 19 20					Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake). System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby instruments Prolonged loss of communications (PLOC) between pilot and controller(s) Landing gear retraction failure Engine failure Cabin pressure drop as a result of pneumatic system failure Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll Lack of or poor communication quality Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution inadequate aircraft de-icing / anti-icing inadequate aircraft de-icing / anti-icing inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components Flaws in manufacturer quality control process - Power supply system components Flaws in aircraft system maintenance process definition - Communication equipment systems and components.	216 366 25 26 53 63 77 79 98 146 149 150 180 230 238 270
8 9 10 11 12 13 14 15 16 17 18					Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxing control related system and components (incl. brake). System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby instruments Prolonged loss of communications (PLOC) between pilot and controller(s) Landing gear retraction failure Cabin pressure drop as a result of pneumatic system failure Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll Lack of or poor communication quality Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution inadequate aircraft de-icing / anti-icing Inadequate aircraft de-icing / anti-icing Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components Flaws in manufacturer quality control process - Power supply system components Flaws in manufacturer system maintenance process definition - Coolmanucation equipment systems and components.	216 366 25 26 53 77 79 98 146 149 150 180 230 238
8 9 10 11 12 13 14 15 16 17 18 19					Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake). System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby instruments Prolonged loss of communications (PLOC) between pilot and controller(s) Landing gear retraction failure Engine failure Cabin pressure drop as a result of pneumatic system failure Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll Lack of or poor communication quality Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate aircraft de-icing / anti-icing Inadequate aircraft de-icing / anti-icing Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components Flaws in manufacturer quality control process - Power supply system components Flaws in aircraft system maintenance process definition - Communication equipment systems and components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.	216 366 25 26 53 63 77 79 98 146 149 150 180 230 238 270
8 9 10 11 12 13 14 15 16 17 18 19 20					Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxing control related system and components (incl. brake). System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby instruments Prolonged loss of communications (PLOC) between pilot and controller(s) Landing gear retraction failure Cabin pressure drop as a result of pneumatic system failure Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll Lack of or poor communication quality Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution inadequate aircraft de-icing / anti-icing Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components Flaws in manufacturer quality control process - Power supply system components Flaws in manufactural system maintenance process definition - Communication equipment systems and components control of the system of product compliance with requirements - Communication equipment systems and components. Flaws and components. Flaws and components. Flaws and components. Flaws and components of the system o	216 366 25 26 53 63 77 79 98 146 149 150 180 230 238 270
8 9 10 11 12 13 14 15 16 17 18 19 20					Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake). System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby instruments Prolonged loss of communications (PLOC) between pilot and controller(s) Landing gear retraction failure Engine failure Cabin pressure drop as a result of pneumatic system failure Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll Lack of or poor communication quality Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate aircraft de-icing / anti-icing Inadequate aircraft de-icing / anti-icing Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components Flaws in manufacturer quality control process - Power supply system components Flaws in aircraft system maintenance process definition - Communication equipment systems and components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.	216 366 25 26 53 63 77 79 98 146 149 150 180 230 238 270
8 9 10 11 12 13 14 15 16 17 18 18 19 20 21 22					Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxing control related system and components (incl. brake). System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby instruments Prolonged loss of communications (PLOC) between pilot and controller(s) Landing gear retraction failure Engine failure Cabin pressure drop as a result of pneumatic system failure Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll Lack of or poor communication quality Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution inadequate aircraft de-icing / anti-icing inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components Flaws in manufacturer quality control process - Power supply system components Flaws in airard system maintenance process definition - Communication equipment systems and components certification process and / or flaws in methodology concerning verification of the system of product compliance with requirements - Communication equipment systems and components. Flaws in airarda to process and / or flaws in methodology concerning verification of the system of product compliance with requirements - Communication equipment systems and components. Flaws in airarda to process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.	216 366 25 26 53 77 79 98 146 149 150 230 238 270 271
8 9 10 11 12 13 14 15 16 17 18 18 19 20 21 22					Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake). System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby instruments Prolonged loss of communications (PLOC) between pilot and controller(s) Landing gear retraction failure Engine failure Cabin pressure drop as a result of pneumatic system failure Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll Lack of or poor communication quality Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate aircraft de-icing / anti-icing Inadequate aircraft de-icing / anti-icing Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components Flaws in manufacturer quality control process - Power supply system components Flaws in manufacturer quality control process - Power supply system components Flaws in manufacturer quality control process - Communication equipment systems and components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance	216 366 25 26 53 77 79 98 146 149 150 230 238 270 271
8 9 10 11 12 13 14 15 16 17 20 21 22 23 24					Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxing control related system and components (incl. brake). System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby instruments Prolonged loss of communications (PLOC) between pilot and controller(s) Landing gear retraction failure Cabin pressure drop as a result of pneumatic system failure Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll Lack of or poor communication quality Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution inadequate aircraft de-icing / anti-icing inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components Flaws in manufacturer quality control process - Power supply system components Flaws in manufacturer quality control process - Power supply system components Flaws in amanufacturer quality control process - Communication equipment systems and components. Flaws and components. Flaws and components. Flaws in manufacturer quality control process - Communication equipment systems and components. Flaws in sirraria system maintenance process definition - Communication equipment systems and components. Flaws in sirraria system maintenance process and for flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.	216 366 25 26 53 63 77 79 98 146 149 150 230 238 270 271 272 288
8 9 10 11 12 13 14 15 16 17 20 21 22 23 24 25					Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake). System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby instruments Prolonged loss of communications (PLOC) between pilot and controller(s) Landing gear retraction failure Engine failure Cabin pressure drop as a result of pneumatic system failure Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll Lack of or poor communication quality Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate aircraft de-icing / anti-icing Inadequate aircraft de-icing / anti-icing Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components Flaws in manufacturer quality control process - Power supply system components Flaws in aircraft system maintenance process definition - Communication equipment systems and components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) F	216 366 25 26 53 63 77 79 98 146 149 150 180 230 238 270 271 272 288 299
8 9 10 11 12 13 14 15 16 17 20 21 22 23 24					Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake). System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby instruments Prolonged loss of communications (PLOC) between pilot and controller(s) Landing gear retraction failure Cabin pressure drop as a result of pneumatic system failure Other cockpit effects / maifunctions (genuine or spurious) occurring during takeoff roll Lack of or poor communication quality Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - inadequate workload distribution inadequate aircraft de-icing / anti-icing Inadequate aircraft de-icing / anti-icing Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components Flaws in manufacturer quality control process - Power supply system components Flaws in manufacturer quality control process - Power supply system components Flaws in manufacturer quality control process - Communication equipment systems and components. Flaws in manufacturer quality control process - Communication equipment systems and components. Flaws in manufacturer quality control process - Communication equipment systems and components. Flaws in manufacturer quality control process - Communication equipment systems and components. Flaws in manufacturer quality control process - FMS subsystems and components of the system / product compliance with requirements - Components of Wing control surface yaste or product compliance with requirements -	216 366 25 26 53 63 77 79 98 146 149 150 230 238 270 271 272 288



	Base events	Code	Definition	Identifiable precursors	No.
				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the	
28 29				engine Navigation deviation	316 317
30	-			Navigation deviation Flaws in manufacturer quality control process - Autothrottle system in the engine.	324
30				Flaws in aircraft system maintenance process definition - Autothrottle system in the	324
31				engine.	325
				Inadequate certification process and / or flaws in methodology concerning verification	
				of the system / product compliance with requirements - Hydraulic system	
32				components	333
33			+	Flaws in aircraft system maintenance process definition - Hydraulic System	334
				Inadequate certification process and / or flaws in methodology concerning verification	,
34				of the system / product compliance with requirements - Landing gear components	358
				Flaws in aircraft system maintenance process definition - FMS subsystems and	П
35				components (autopilot incl.)	410
				Inadequate certification process and / or flaws in methodology concerning verification	
36				of the system / product compliance with requirements - APU systems and / or components	464
30				Flaws in aircraft system maintenance process definition - APU systems and / or	707
37				components	466
				Flaws in aircraft system maintenance process definition - Fire detection system	П
38				components	474
				Inadequate certification process and / or flaws in methodology concerning verification	
39				of the system / product compliance with requirements - Fire deection system components	475
40			<u> </u>	Flaws in manufacturer quality control process - Fire detection system components	476
41				Flaws in aircraft system maintenance process definition - Fire warning system	477
				· · · · · · · · · · · · · · · · · · ·	П
			Ì	Inadequate certification process and / or flaws in methodology concerning verification	
42				of the system / product compliance with requirements - Fire warning system	478
43				Flaws in manufacturer quality control process - Fire warning system	479
				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system	
44				components	480
				Flaws in aircraft system maintenance process definition - Fire extinguishing system	П
45				components	481
					400
46				Flaws in manufacturer quality control process - Fire extinguishing system components Flaws in aircraft system maintenance process definition - Onboard navigational	482
47				systems and components	491
				Inadequate certification process and / or flaws in methodology concerning verification	
				of the system / product compliance with requirements - Onboard navigational	
48				systems and components.	492
				Flaws in manufacturer quality control process - Onboard navigational systems and	
49				components. Inadequate certification process and / or flaws in methodology concerning verification	493
				of the system / product compliance with requirements - Aircraft door system and / or	
50				components	391
				Inadequate certification process and / or flaws in methodology concerning verification	
				of the system / product compliance with requirements - Aircraft door system and / or	
52				components	391
53				Flaws in aircraft system maintenance process definition - Power supply system	387
54				components Flaws in manufacturer quality control process -Hydraulic system components.	386
J.				Inadequate certification process and / or flaws in methodology concerning verification	
				of the system / product compliance with requirements - other critical flight	
55				instruments and systems.	385
				Flaws in aircraft system maintenance process definition - other critical flight	1!
56				instruments and systems. Inadequate certification process and / or flaws in methodology concerning verification	383
				of the system / product compliance with requirements - Drag control system	
58				components.	381
				Flaws in aircraft system maintenance process definition - Drag control system	\vdash
59				components.	379
60			1	Flaws in manufacturer quality control process - Drag control system componentss.	378
61 62				Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components.	377 376
02	1	+	+	Inadequate certification process and / or flaws in methodology concerning verification	
				of the system / product compliance with requirements - Pneumatic system	
63				components.	375
П				Flaws in aircraft system maintenance process definition - Pneumatic system	\Box
64				components.	374
65 66			<u> </u>	Flaws in manufacturer quality control process - Pneumatic system componentss. Pilot tiredness - Inadequate workload distribution	373 167
67		+	<u> </u>	Flaws in pilot requirements definition process and/or training methodology	168
H			<u> </u>	Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP	1 200
68				decision	207
69				Poor application of T/O & RTO procedure, failure recognition and preparedness	209
	20 Barden and 15 4 3	TOC1025	Failure of the flight crew to apply all the braking systems	Dilet the decree bands and the Control of	1
2	20 Brakes not applied correctly	TO01B33	immediately after take-off rejection	Pilot tiredness - Inadequate workload distribution	167 168
3	+		+	Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, braking initiation sequence	168
			<u> </u>	System failure affecting aircraft configuration, controllability and/or flying qualities	25
4				System failure affecting the operation of primary instruments / displays or standby	1
4			Ì	instruments	26
5					53
5				Prolonged loss of communications (PLOC) between pilot and controller(s)	
5 6 7				Landing gear retraction failure	63
5 6 7 8				Landing gear retraction failure Engine failure	63 77
5 6 7				Landing gear retraction failure	63



		Base events	Code	Definition	Identifiable precursors	No.
11					Lack of or poor communication quality	146
					Flaws in maintenance technician / airworthiness specialist requirements definition	
12					process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	149
13					distribution	150
14					Inadequate aircraft de-icing / anti-icing	180
					Inadequate certification process and / or flaws in methodology concerning verification	
15					of the system / product compliance with requirements - Power supply system	220
15 16					components Flaws in manufacturer quality control process - Power supply system components	230 238
10					Flaws in aircraft system maintenance process definition - Communication equipment	230
17					systems and components.	270
П					Inadequate certification process and / or flaws in methodology concerning verification	
					of the system / product compliance with requirements - Communication equipment	'
18					systems and components. Flaws in manufacturer quality control process - Communication equipment systems	271
19					and components.	272
13					Inadequate certification process and / or flaws in methodology concerning verification	2,72
					of the system / product compliance with requirements - Components of Wing control	'
20					surface system.	288
					Inadequate certification process and / or flaws in methodology concerning verification	'
24					of the system / product compliance with requirements - FMS subsystems and	200
21					components (autopilot incl.) Flaws in manufacturer quality control process - FMS subsystem and components	299
22					(autopilot incl.)	306
f					Flaws in aircraft system maintenance process definition - Components of Wing control	
23					surface system.	311
ا ₋ ا			_		Flaws in manufacturer quality control process - Components of Wing control surface	1. 1
24			 		system.	314
					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the	
25			1		engine	316
26					Navigation deviation	317
27					Flaws in manufacturer quality control process - Autothrottle system in the engine.	324
					Flaws in aircraft system maintenance process definition - Autothrottle system in the	
28			-		engine.	325
					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system	'
29					components	333
30					Flaws in aircraft system maintenance process definition - Hydraulic System	334
П						
					Inadequate certification process and / or flaws in methodology concerning verification	
31					of the system / product compliance with requirements - Landing gear components	358
32					Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)	410
32					Inadequate certification process and / or flaws in methodology concerning verification	410
					of the system / product compliance with requirements - APU systems and / or	'
33					components	464
					Flaws in aircraft system maintenance process definition - APU systems and / or	
34					components	466
35					Flaws in aircraft system maintenance process definition - Fire detection system components	474
33					Inadequate certification process and / or flaws in methodology concerning verification	4/4
					of the system / product compliance with requirements - Fire deection system	'
36					components	475
37					Flaws in manufacturer quality control process - Fire detection system components	476
38					Flaws in aircraft system maintenance process definition - Fire warning system	477
					Inadequate certification process and / or flaws in methodology concerning verification	'
39			1		of the system / product compliance with requirements - Fire warning system	478
40					Flaws in manufacturer quality control process - Fire warning system	479
Г					Inadequate certification process and / or flaws in methodology concerning verification	П
			1		of the system / product compliance with requirements - Fire extinguishing system	
41			 		components	480
42			1		Flaws in aircraft system maintenance process definition - Fire extinguishing system components	481
74			 		Components	401
43	L		<u> </u>		Flaws in manufacturer quality control process - Fire extinguishing system components	482
					Flaws in aircraft system maintenance process definition - Onboard navigational	\neg
	'					
44					systems and components	491
44					Inadequate certification process and / or flaws in methodology concerning verification	491
					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational	
45					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	491 492
					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational	
45					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. Inadequate certification process and / or flaws in methodology concerning verification	492
45 46					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or	492 493
45					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components	492
45 46					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components Inadequate certification process and / or flaws in methodology concerning verification	492 493
45 46					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components	492 493
45 46 47					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or	492 493 391
45 46 47 49					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components Flaws in aircraft system maintenance process definition - Power supply system components	492 493 391 391 387
45 46 47					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components Flaws in aircraft system maintenance process definition - Power supply system components Flaws in manufacturer quality control process - Hydraulic system components.	492 493 391
45 46 47 49					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components Flaws in aircraft system maintenance process definition - Power supply system components Flaws in manufacturer quality control process - Hydraulic system components. Inadequate certification process and / or flaws in methodology concerning verification	492 493 391 391 387
45 46 47 49 50 51					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components Flaws in aircraft system maintenance process definition - Power supply system components Flaws in aircraft system maintenance process - Hydraulic system components. Flaws in manufacturer quality control process - Hydraulic system components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - other critical flight	492 493 391 391 387 386
45 46 47 49 50					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components Flaws in aircraft system maintenance process definition - Power supply system components Flaws in manufacturer quality control process - Hydraulic system components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - other critical flight instruments and systems.	492 493 391 391 387
45 46 47 49 50 51					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components Flaws in aircraft system maintenance process definition - Power supply system components Flaws in manufacturer quality control process -Hydraulic system components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - other critical flight instruments and systems. Flaws in aircraft system maintenance process definition - other critical flight instruments and systems.	492 493 391 391 387 386
45 46 47 49 50 51					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components Flaws in aircraft system maintenance process definition - Power supply system components Flaws in manufacturer quality control process - Hydraulic system components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - other critical flight instruments and systems.	492 493 391 391 387 386
45 46 47 49 50 51					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components Flaws in aircraft system maintenance process definition - Power supply system components Flaws in inamufacturer quality control process -Hydraulic system components. Flaws in manufacturer quality control process -Hydraulic system components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - other critical flight instruments and systems. Flaws in aircraft system maintenance process definition - other critical flight instruments and systems.	492 493 391 391 387 386



	Base events	Code	Definition	Identifiable precursors
				Flaws in aircraft system maintenance process definition - Drag control system
				components.
				Flaws in manufacturer quality control process - Drag control system componentss.
				Flaws in aircraft system maintenance process definition - Landing gear components.
				Flaws in manufacturer quality control process - Landing gear components. Inadequate certification process and / or flaws in methodology concerning verification
				of the system / product compliance with requirements - Pneumatic system
				components. Flaws in aircraft system maintenance process definition - Pneumatic system
				components.
				Flaws in manufacturer quality control process - Pneumatic system componentss.
				Pilot tiredness - Inadequate workload distribution
				Flaws in pilot requirements definition process and/or training methodology
				Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision
				Poor application of T/O & RTO procedure, failure recognition and preparedness
	Air Traffic related event			Air Traffic related event
			Inadequate take-off instruction is given by the Air Traffic Control	
1	Take-off instruction error by ATCO	TO02B11111	Officer (ATCO) which causes a potential hazardous encounter	Convective weather / turbulence / windshear or crosswind conditions during take-off
				Traffic controller tiredness - Inadequate workload distribution
				Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots
				Flaws in traffic controller requirements definition process and/or training
				methodology
			Ineffective communication between ATCO and flight crew that leads to misunderstanding, and which causes a potential hazardous	
2	Inadequate communication with pilot	TO02B11112	encounter	Lack of English proficiency
				Incorrect or confusing / misleading ATC instructions
				Use of non-standard phraseology by pilot and/or controller
				Traffic controller tiredness - Inadequate workload distribution
		_		Flaws in traffic controller requirements definition process and/or training
				methodology
				Lack of or poor communication quality
		1		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver
				Pilot tiredness - Inadequate workload distribution
				· · · · · · · · · · · · · · · · · · ·
	Pilot failure to follow take-off		Flight crew fails to carry out the instruction given by ATCO and	Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for GND movements. Lack of awareness of own position on
3	instructions	TO02B1112	which causes a potential hazardous encounter	the airsite and airport topology.
	mistractions	TOOZDITIZ	which causes a potential hazardous cheoditer	Pilot tiredness - Inadequate workload distribution
				Flaws in pilot requirements definition process and/or training methodology
				Lack of adherence to Rules of the Air - adherence to Controller clearance
	Separation Infringement with		Aircraft loses separation with an aircraft departing which is caused	Lack of adherence to SOP for GND movements. Lack of awareness of other traffic
4	Departing Aircraft caused by other a/c	TO02B11211	by the other aircraft	movements through listening of ATC communications
				Lack of adherence to SOP for GND movements. Lack of awareness of own position on
				the airsite and airport topology.
				Lack of adherence to SOP for GND movements. Lack of awareness in terms of
				sufficient separation / clearence
				Lack of adherence to SOP for GND movements. Lack of awareness in terms of current
				situation on the airsite or / and aircraft / vehicle proximity
				Pilot tiredness - Inadequate workload distribution
				Flaws in pilot requirements definition process and/or training methodology
				Lack of adherence to Rules of the Air - adherence to Controller clearance
	Canagation Infringement with Landing		Aircraft loses separation with an aircraft landing which is caused by	Taxiing without clearance
-	Separation Infringement with Landing Aircraft caused by other a/c	TO02B11212	the other aircraft	Emergency landing
	Ancial caused by other a/c	TOOZDITZIZ	the other and are	Landing without clearance
				Lack of adherence to Rules of the Air - runway used for alternating take-offs and
				landings
		İ		Pilot tiredness - Inadequate workload distribution
				Flaws in pilot requirements definition process and/or training methodology
				Lack of adherence to Rules of the Air - adherence to Controller clearance
_	Separation Infringement with a/c on missed approach	TO02B11213	Aircraft loses separation with an aircraft performing a missed	Emergency landing
ь	imaacu approdtii	1002011213	approach	Emergency landing Lack of adherence to SOP for GND movements in terms of clearance providing by the
		I		controller.
				Traffic controller tiredness - Inadequate workload distribution
				Flaws in traffic controller requirements definition process and/or training
				methodology
				Landing without clearance
		1		Lack of adherence to Rules of the Air - runway used for alternating take-offs and
		 		Indings Dilet tisodeses, leadequate workland distribution
	l .	-		Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology
				Lack of adherence to Rules of the Air - adherence to Controller clearance
	Separation Infringement with			
	departing a/c caused by aircraft taking		Aircraft loses separation with an aircraft departing which is caused	Lack of adherence to SOP for GND movements. Lack of awareness of other traffic
7		TO02B11214	Aircraft loses separation with an aircraft departing which is caused by the aircraft preparing to take-off	Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications
7	departing a/c caused by aircraft taking	TO02B11214		Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications Lack of adherence to SOP for GND movements. Lack of awareness in terms of current
7	departing a/c caused by aircraft taking	TO02B11214		Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity
7	departing a/c caused by aircraft taking	T002B11214		Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Takeoff without clearance
7	departing a/c caused by aircraft taking	T002B11214		Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Takeoff without clearance Pilot tiredness - Inadequate workload distribution
7	departing a/c caused by aircraft taking	T002B11214		Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Takeoff without clearance Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology
7	departing a/c caused by aircraft taking off	T002B11214	by the aircraft preparing to take-off	Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Takeoff without clearance Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to Rules of the Air - adherence to Controller clearance
	departing a/c caused by aircraft taking off Separation Infringement with landing		by the aircraft preparing to take-off Aircraft loses separation with an aircraft landing which is caused by	Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Takeoff without clearance Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to Rules of the Air - adherence to Controller clearance Lack of adherence to SOP for GND movements. Lack of awareness of other traffic
	departing a/c caused by aircraft taking off	TO02B11214 TO02B11215	by the aircraft preparing to take-off	Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Takeoff without clearance Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications
	departing a/c caused by aircraft taking off Separation Infringement with landing		by the aircraft preparing to take-off Aircraft loses separation with an aircraft landing which is caused by	Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Takeoff without clearance Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to Rules of the Air - adherence to Controller clearance Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications Takeoff without clearance
	departing a/c caused by aircraft taking off Separation Infringement with landing		by the aircraft preparing to take-off Aircraft loses separation with an aircraft landing which is caused by	Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Takeoff without clearance Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to Rules of the Air - adherence to Controller clearance Lack of adherence to Tourney of the Air - adherence to Graveness of other traffic movements through listening of ATC communications Takeoff without clearance Pilot tiredness - Inadequate workload distribution
	departing a/c caused by aircraft taking off Separation Infringement with landing		by the aircraft preparing to take-off Aircraft loses separation with an aircraft landing which is caused by	Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Takeoff without clearance Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications Takeoff without clearance Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology
	departing a/c caused by aircraft taking off Separation Infringement with landing		by the aircraft preparing to take-off Aircraft loses separation with an aircraft landing which is caused by	Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Takeoff without clearance Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to Rules of the Air - adherence to Controller clearance Lack of adherence to Tourney of the Air - adherence to Graveness of other traffic movements through listening of ATC communications Takeoff without clearance Pilot tiredness - Inadequate workload distribution



		Base events	Code	Definition	Identifiable precursors	No.
2					Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168
4					Lack of adherence to Rules of the Air - adherence to Controller clearance	296
H				Traffic density above the airport is too high to allow the departing		1-00
1	10	Traffic density too high	TO02B1122	aircraft to take-off	Flaws in Airspace and Air Traffic planning procedures design process	323
2				Flight crew are still preparing the aircraft for take-off when	Flaws in airport capacity management process	400
				clearance is given resulting in the aircraft missing the allotted		
1	11	Aircraft not ready to take-off	TO02B1123	clearance slot	Pilot tiredness - Inadequate workload distribution	167
2					Flaws in pilot requirements definition process and/or training methodology	168
3					Flaws in CRM training procedures	263
4					Lack of adherence to the main CRM rules Lack of adherence to SOP for take-off procedure in terms of time limitation for take-	264
5					off preparation.	404
П				The presence of animal in the runway area and which may cause a		
1	12	Animals in vicinity of runway	TO02B1124	collision hazard	Wildlife incursion	5
2					Bird strike Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction	34
3					procedure	162
Ħ					Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence	1
4					integrity monitoring	401
			T000004405	ATC advise the flight crew that the weather is unsuitable for take-		
1		Weather Related Problem Effective Hazard Avoidance	TO02B1125 TO02B12	off ATC instructs aircraft to stop during take-off roll	Convective weather / turbulence / windshear or crosswind conditions during take-off Risk of dangerous occurences appeared during take-off roll	32 85
11 +		Enective Hazard / Wordanies	1002512	A TO HIST dees directed to stop during take on You	insk of dangerous occurrees appeared daring take on row	- 03
1 11		Flight Crew rejects take-off			Flight Crew rejects take-off	
П				The pilot fails to understand the air traffic situation and as a result		
2	15	Pilot Misdiagnosis	TO02B211	aborts the take-off above V1	Pilot tiredness - Inadequate workload distribution	167 168
3			+		Flaws in pilot requirements definition process and/or training methodology Late rejected takeoff decision / initiation	168 368
4					Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations	384
5					Wildlife incursion	5
6					Emergency landing	8
-					Convective weather / turbulence / windchess or executing conditions during the	32
8					Convective weather / turbulence / windshear or crosswind conditions during take-off Bird strike	34
9					Risk of dangerous occurences appeared during take-off roll	85
П					Lack of adherence to SOP for GND movements in terms of clearance providing by the	
10					controller.	127
11 12					Lack of English proficiency	132 133
13					Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller	134
14					Traffic controller tiredness - Inadequate workload distribution	137
П					Inefficient / confusing TWR traffic control procedures, inefficient management of hot	
15					spots	139
16					Lack of adherence to SOP for GND movements. Lack of awareness of other traffic	140
16					movements through listening of ATC communications Lack of adherence to SOP for GND movements. Lack of awareness of own position on	140
17					the airsite and airport topology.	142
П					Lack of adherence to SOP for GND movements. Lack of awareness in terms of	
18					sufficient separation / clearence	143
10					Lack of adherence to SOP for GND movements. Lack of awareness in terms of current	1
19					situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training	144
20					methodology	145
21					Lack of or poor communication quality	146
_					Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	
22					driver Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	148
23					or / and passive contribution to the PF duties	151
24					Takeoff without clearance	157
25					Landing without clearance	158
					Lack of adherence to Rules of the Air - runway used for alternating take-offs and	[, ,]
26					landings Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction	160
27					procedure	162
28					Pilot tiredness - Inadequate workload distribution	167
29					Flaws in pilot requirements definition process and/or training methodology	168
30 31					Flaws in CRM training procedures	263
31			+		Lack of adherence to the main CRM rules Lack of adherence to Rules of the Air - adherence to Controller clearance	264 296
33					Flaws in Airspace and Air Traffic planning procedures design process	323
34					Flaws in airport capacity management process	400
П					Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence	
35			-		integrity monitoring Lack of adherence to SOP for take-off procedure in terms of time limitation for take-	401
36					off preparation.	404
37					Taxiing without clearance	367
П				The pilot diagnoses the air traffic situation but misjudges the		
1	16	Pilot Misjudgement	TO02B212	response and incorrectly aborts the take-off above V1	Pilot tiredness - Inadequate workload distribution	167
2					Flaws in pilot requirements definition process and/or training methodology	168
3					Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207
4					Late rejected takeoff decision / initiation	368
5					Wildlife incursion	5
6					Emergency landing	8
					Convective weather / turbulence / windshear or crosswind conditions during take-off	32
_						
7						
7 8 9					Bird strike Risk of dangerous occurences appeared during take-off roll	34 85
					Bird strike	34



11		Base events	Code	Definition	Identifiable precursors	No.
					Lack of English proficiency	132
12					Incorrect or confusing / misleading ATC instructions	133
13 14					Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution	134
14					Inefficient / confusing TWR traffic control procedures, inefficient management of hot	137
15					spots	139
					Lack of adherence to SOP for GND movements. Lack of awareness of other traffic	
16					movements through listening of ATC communications Lack of adherence to SOP for GND movements. Lack of awareness of own position on	140
17					the airsite and airport topology.	142
П					Lack of adherence to SOP for GND movements. Lack of awareness in terms of	
18					sufficient separation / clearence	143
					Lack of adherence to SOP for GND movements. Lack of awareness in terms of current	
19					situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training	144
20					methodology	145
21					Lack of or poor communication quality	146
					Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	
22					driver	148
					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	
23 24					or / and passive contribution to the PF duties Takeoff without clearance	151 157
25					Landing without clearance	158
					Lack of adherence to Rules of the Air - runway used for alternating take-offs and	
26					landings	160
					Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction	_ ا
27					procedure Pilot tiredness - Inadequate workload distribution	162
28 29					Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168
30					Flaws in CRM training procedures	263
31					Lack of adherence to the main CRM rules	264
32					Lack of adherence to Rules of the Air - adherence to Controller clearance	296
33					Flaws in Airspace and Air Traffic planning procedures design process	323
34					Flaws in airport capacity management process Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence	400
35					integrity monitoring	401
33					Lack of adherence to SOP for take-off procedure in terms of time limitation for take-	401
36					off preparation.	404
37					Taxiing without clearance	367
				If the take-off is rejected when the aircraft is below V1 then this is a		
1		Take-off rejected correctly when below V1	TO02B22	success, but it must be included to obtain the pivotal event	nat idantifiable at that level	
2	1/	VI	1002622	probability.	not identifiable at that level Wildlife incursion	5
3					Emergency landing	8
					<u> </u>	
4					Convective weather / turbulence / windshear or crosswind conditions during take-off	32
5					Bird strike	
6						34
7					Risk of dangerous occurences appeared during take-off roll	85
					Risk of dangerous occurences appeared during take-off roll Lack of adherence to SOP for GND movements in terms of clearance providing by the	85
8					Risk of dangerous occurences appeared during take-off roll	
9					Risk of dangerous occurences appeared during take-off roll Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	127
9 10					Risk of dangerous occurences appeared during take-off roll Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller	127 132 133 134
9					Risk of dangerous occurences appeared during take-off roll Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution	127 132 133
9 10 11					Risk of dangerous occurences appeared during take-off roll Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller triedness - inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot	127 132 133 134 137
9 10					Risk of dangerous occurences appeared during take-off roll Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	127 132 133 134
9 10 11					Risk of dangerous occurences appeared during take-off roll Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller triedness - inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot	127 132 133 134 137
9 10 11 12 13					Risk of dangerous occurences appeared during take-off roll Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of awareness of other traffic	127 132 133 134 137 139
9 10 11					Risk of dangerous occurences appeared during take-off roll Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.	127 132 133 134 137
9 10 11 12 13					Risk of dangerous occurences appeared during take-off roll Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of	127 132 133 134 137 139 140
9 10 11 12 13					Risk of dangerous occurences appeared during take-off roll Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence	127 132 133 134 137 139
9 10 11 12 13					Risk of dangerous occurences appeared during take-off roll Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of	127 132 133 134 137 139 140
9 10 11 12 13 14					Risk of dangerous occurences appeared during take-off roll Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of	127 132 133 134 137 139 140 142
9 10 11 12 13 14 15 16					Risk of dangerous occurences appeared during take-off roll Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology	127 132 133 134 137 139 140 142 143
9 10 11 12 13 14 15					Risk of dangerous occurences appeared during take-off roll Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality	127 132 133 134 137 139 140 142 143 144 145 146
9 10 11 12 13 14 15 16 17 18					Risk of dangerous occurences appeared during take-off roll Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of or poor communication quality Lack of or poor communication pilot / vehicle	127 132 133 134 137 139 140 142 143 144
9 10 11 12 13 14 15 16					Risk of dangerous occurences appeared during take-off roll Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	127 132 133 134 137 139 140 142 143 144 145 146
9 10 11 12 13 14 15 16 17 18					Risk of dangerous occurences appeared during take-off roll Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	127 132 133 134 137 139 140 142 143 144 145 146
9 10 11 12 13 14 15 16 17 18					Risk of dangerous occurences appeared during take-off roll Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	127 132 133 134 137 139 140 142 143 144 145 146
9 10 11 12 13 14 15 16 17 18 19					Risk of dangerous occurences appeared during take-off roll Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Takeoff without clearance Landing without clearance	127 132 133 134 137 139 140 142 143 144 145 146
9 10 11 12 13 14 15 16 17 18 19 20 21 22					Risk of dangerous occurences appeared during take-off roll Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Lack of adherence to SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Takeoff without clearance Lack of adherence to Rules of the Air - runway used for alternating take-offs and	127 132 133 134 137 139 140 142 143 144 145 146 148 151 157
9 10 11 12 13 14 15 16 17 18 19 20 21					Risk of dangerous occurences appeared during take-off roll Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology Lack of apherence to SOP in terms of communication between ATC and pilot / vehicle driver Lack of adherence to SOP in terms of FNF flight parameters / situation monitoring or / and passive contribution to the PF duties Takeoff without clearance Landing without clearance Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	127 132 133 134 137 139 140 142 143 144 145 146 148
9 10 11 12 13 14 15 16 17 18 19 20 21 22 23					Risk of dangerous occurences appeared during take-off roll Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Lack of adherence to SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Takeoff without clearance Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction	127 132 133 134 137 139 140 142 143 144 145 146 151 157 158
9 10 11 12 13 14 15 16 17 18 19 20 21 22 23					Risk of dangerous occurences appeared during take-off roll Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Lack of adherence to SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Takeoff without clearance Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	127 132 133 134 137 139 140 142 143 144 151 157 158 160 162
9 10 11 12 13 14 15 16 17 18 19 20 21 22 23					Risk of dangerous occurences appeared during take-off roll Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Lack of adherence to SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Takeoff without clearance Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction	127 132 133 134 137 139 140 142 143 144 145 146 151 157 158
9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27					Risk of dangerous occurences appeared during take-off roll Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology Lack of apherence to SOP in terms of communication between ATC and pilot / vehicle driver Lack of adherence to SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Takeoff without clearance Landing without clearance Landing without clearance Landing without clearance Landing methodology Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Pilot tiredness - Inadequate workload distribution	127 132 133 134 137 139 140 142 143 144 151 157 158 160 162 167
9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28					Risk of dangerous occurences appeared during take-off roll Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology Lack of ar poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Lack of adherence to SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Takeoff without clearance Landing without clearance Landing without clearance Landing without clearance Landing without clearance Land of adherence to Rules of the Air - runway used for alternating take-offs and landings Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings Lack of adherence to Rules of the Air - runway used for internating take-offs and landings Lack of adherence to Rules of the Air - runway used for internating take-offs and landings Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings Lack of adherence to Rules of the Air - runway used for inter	127 132 133 134 137 139 140 142 143 144 145 151 157 158 160 162 167 168 263 264
9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29					Risk of dangerous occurences appeared during take-off roll Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Takeoff without clearance Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Flaws in CRM training procedures Lack of adherence to Rules of the Air - adherence to Controller clearance	127 132 133 134 137 140 142 143 144 145 146 151 157 158 160 162 167 168 263 264 296
9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30					Risk of dangerous occurences appeared during take-off roll Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Takeoff without clearance Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings Lack of adherence to Rules of the Air - sunway used for alternating take-offs and landings Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Flaws in CRM training procedures Lack of adherence to the main CRM rules Lack of adherence to Rules of the Air - adherence to Controller clearance Flaws in Airspace and Air Traffic planning procedures design proces	127 132 133 134 137 140 142 143 144 151 157 158 160 162 162 163 263 263 264 323
10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29					Risk of dangerous occurences appeared during take-off roll Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Lack of adherence to SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Takeoff without clearance Landing without clearance Landing without clearance Landing without clearance Landing without clearance Landing without clearance Landing without clearance Landing mythout clearance Landi	127 132 133 134 137 140 142 143 144 145 146 151 157 158 160 162 167 168 263 264 296
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9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31					Risk of dangerous occurences appeared during take-off roll Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Takeoff without clearance Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings Lack of adherence to Rules of the Air - sunway used for alternating take-offs and landings Lack of adherence to Rules of the Air - sunway used for alternating take-offs and landings Lack of adherence to Rules of the Air - adherence to Controller clearance Flaws in pilot requirements definition process and/or training methodology Flaws in CRM training procedures Lack of adherence to Rules of the Air - adherence to Controller clearance Fla	127 132 133 134 137 140 142 143 144 145 146 151 157 158 160 162 167 168 264 296 323 400



		Base events	Code	Definition	Identifiable precursors	No.
ш						
+ II						
+1 11		Failure to achieve maximum braking			Failure to achieve maximum braking	ш
				The runway is too short under wet or icy runway conditions for the plane to come to a halt even if the take-off is aborted before V1 is		
1	18	Insufficient Runway Length	TO02B31	reached.	Convective weather - heavy rain resulted with wet RWY surface	75
3					Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168
4					Gross error in takeoff weight entry and/or in V1 / VR speeds assessment	179
					Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of	П
اءا					RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum	203
3					Internation	203
6					High energy RTO rate is an indicator of improper Operator's policy for T/O operations.	211
7 8					Poor application of T/O & RTO procedure, computation of T/O parameters Wildlife incursion	260 5
9					Emergency landing	8
10 11					Convective weather / turbulence / windshear or crosswind conditions during take-off Bird strike	32 34
12					Risk of dangerous occurences appeared during take-off roll	85
					Lack of adherence to SOP for GND movements in terms of clearance providing by the	
13					controller. Lack of English proficiency	127 132
15					Incorrect or confusing / misleading ATC instructions	133
16					Use of non-standard phraseology by pilot and/or controller	134
17			1		Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot	137
18					spots	139
					Lack of adherence to SOP for GND movements. Lack of awareness of other traffic	
19					movements through listening of ATC communications Lack of adherence to SOP for GND movements. Lack of awareness of own position on	140
20					the airsite and airport topology.	142
					Lack of adherence to SOP for GND movements. Lack of awareness in terms of	П
21					sufficient separation / clearence	143
22					Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity	144
					Flaws in traffic controller requirements definition process and/or training	
23					methodology Lack of or poor communication quality	145 146
24					Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	146
25					driver	148
26					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	
26 27					or / and passive contribution to the PF duties Takeoff without clearance	151 157
28					Landing without clearance	158
29					Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	160
29					Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction	100
30					procedure	162
31 32					Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168
33					Flaws in CRM training procedures	263
34					Lack of adherence to the main CRM rules	264
35 36					Lack of adherence to Rules of the Air - adherence to Controller clearance Flaws in Airspace and Air Traffic planning procedures design process	296 323
37					Flaws in airport capacity management process	400
					Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence	
38	_				integrity monitoring Lack of adherence to SOP for take-off procedure in terms of time limitation for take-	401
39					off preparation.	404
40					Taxiing without clearance	367
41 42					Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168
72					Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP	100
43					decision	207
44 45			-		Late rejected takeoff decision / initiation Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations	368 384
H				Brakes are not giving maximum braking, i.e. because of improper	- 25	304
1	19	Brakes not functioning correctly	TO02B32	maintenance and damages	System failure affecting aircraft configuration, controllability and/or flying qualities	25
2					Contaminated Runway Flaws in maintenance technician / airworthiness specialist requirements definition	39
3	_				process and/or training methodology	149
					Maintenance technician / airworthiness specialist tiredness - Inadequate workload	
4					distribution Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence	150
5					of contaminations.	216
Ţ					Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing	
6 7	-				control related system and components (incl. brake). Wildlife incursion	366 5
8					Emergency landing	8
9 10					Convective weather / turbulence / windshear or crosswind conditions during take-off Bird strike	32 34
11					Risk of dangerous occurences appeared during take-off roll	85
П					Lack of adherence to SOP for GND movements in terms of clearance providing by the	
4.0			1	1	controller.	127
12 13					Lack of English proficiency	137
12 13 14					Lack of English proficiency Incorrect or confusing / misleading ATC instructions	132 133
13						



	Base events	Code	Definition	Identifiable precursors	No.
		1		Inefficient / confusing TWR traffic control procedures, inefficient management of hot	
17				spots	139
18				Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications	140
10				Lack of adherence to SOP for GND movements. Lack of awareness of own position on	140
19				the airsite and airport topology.	142
				Lack of adherence to SOP for GND movements. Lack of awareness in terms of	
20	_			sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current	143
21				situation on the airsite or / and aircraft / vehicle proximity	144
				Flaws in traffic controller requirements definition process and/or training	
22				methodology	145
23				Lack of or poor communication quality	146
24				Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	148
27				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	140
25				or / and passive contribution to the PF duties	151
26				Takeoff without clearance	157
27				Landing without clearance	158
28				Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	160
20				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction	100
29				procedure	162
30				Pilot tiredness - Inadequate workload distribution	167
31		1		Flaws in pilot requirements definition process and/or training methodology	168
32 33		+		Flaws in CRM training procedures Lack of adherence to the main CRM rules	263 264
34	1	+		Lack of adherence to the main CRM rules Lack of adherence to Rules of the Air - adherence to Controller clearance	296
35		1		Flaws in Airspace and Air Traffic planning procedures design process	323
36				Flaws in airport capacity management process	400
				Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence	
37				integrity monitoring	401
38				Lack of adherence to SOP for take-off procedure in terms of time limitation for take- off preparation.	404
39				Taxiing without clearance	367
40				Pilot tiredness - Inadequate workload distribution	167
41				Flaws in pilot requirements definition process and/or training methodology	168
4.0				Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP	
42 43				decision Late rejected takeoff decision / initiation	207 368
44				Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations	384
					_
44			Failure of the flight crew to apply all the braking systems		
1 2	20 Brakes not applied correctly	TO02B33	Failure of the flight crew to apply all the braking systems immediately after take-off rejection.	Pilot tiredness - Inadequate workload distribution	167
1 2	20 Brakes not applied correctly	TO02B33	I	Flaws in pilot requirements definition process and/or training methodology	168
1 2 2 3	20 Brakes not applied correctly	TO02B33	I	Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, braking initiation sequence	168 199
1 2	20 Brakes not applied correctly	TO02B33	I	Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, braking initiation sequence Wildlife incursion	168
1 2 2 3 4	20 Brakes not applied correctly	TO02B33	I	Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, braking initiation sequence	168 199 5
1 2 2 3 4 5 5 6	20 Brakes not applied correctly	TO02B33	I	Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, braking initiation sequence Wildlife incursion Emergency landing Convective weather / turbulence / windshear or crosswind conditions during take-off	168 199 5 8
1 2 3 4 5 6 7	20 Brakes not applied correctly	TO02B33	I	Flaws in pilot requirements definition process and/or training methodology Poor application of 17.0 & RTO procedure, braking initiation sequence Wildlife incursion Emergency landing Convective weather / turbulence / windshear or crosswind conditions during take-off Bird strike	168 199 5 8 32 34
1 2 2 3 4 5 5 6	20 Brakes not applied correctly	T002B33	I	Flaws in pilot requirements definition process and/or training methodology Poor application of 7/0 & RTO procedure, braking initiation sequence Wildlife incursion Emergency landing Convective weather / turbulence / windshear or crosswind conditions during take-off Bird strike Risk of dangerous occurences appeared during take-off roll	168 199 5 8
1 2 3 4 5 6 7	20 Brakes not applied correctly	TO02B33	I	Flaws in pilot requirements definition process and/or training methodology Poor application of f/O & RTO procedure, braking initiation sequence Wildlife incursion Emergency landing Convective weather / turbulence / windshear or crosswind conditions during take-off Bild strike Risk of dangerous occurences appeared during take-off roll Lack of adherence to SOP for GND movements in terms of clearance providing by the	168 199 5 8 32 34
1 2 3 4 5 5 6 7 8 8 9 10	20 Brakes not applied correctly	T002B33	I	Flaws in pilot requirements definition process and/or training methodology Poor application of 7/0 & RTO procedure, braking initiation sequence Wildlife incursion Emergency landing Convective weather / turbulence / windshear or crosswind conditions during take-off Bird strike Risk of dangerous occurences appeared during take-off roll	168 199 5 8 32 34 85 127 132
1 2 3 4 5 6 7 8 8 9 10 11	20 Brakes not applied correctly	T002B33	I	Flaws in pilot requirements definition process and/or training methodology Poor application of 7/0 & RTO procedure, braking initiation sequence Wildlife incursion Emergency landing Convective weather / turbulence / windshear or crosswind conditions during take-off Bird strike Risk of dangerous occurences appeared during take-off roll Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Lack of English proficiency Incorrect or confusing / misleading ATC instructions	168 199 5 8 32 34 85 127 132 133
1 2 3 4 5 6 7 8 8 9 10 11 12	20 Brakes not applied correctly	T002B33	I	Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, braking initiation sequence Wildlife incursion Emergency landing Convective weather / turbulence / windshear or crosswind conditions during take-off Bird strike Risk of dangerous occurences appeared during take-off roll Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller	168 199 5 8 32 34 85 127 132 133 134
1 2 3 4 5 6 7 8 8 9 10 11	20 Brakes not applied correctly	T002B33	I	Flaws in pilot requirements definition process and/or training methodology Poor application of 7/0 & RTO procedure, braking initiation sequence Wildlife incursion Emergency landing Convective weather / turbulence / windshear or crosswind conditions during take-off Bird strike Risk of dangerous occurences appeared during take-off roll Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution	168 199 5 8 32 34 85 127 132 133
1 2 3 4 5 6 7 8 8 9 10 11 12	20 Brakes not applied correctly	T002B33	I	Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, braking initiation sequence Wildlife incursion Emergency landing Convective weather / turbulence / windshear or crosswind conditions during take-off Bird strike Risk of dangerous occurences appeared during take-off roll Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller	168 199 5 8 32 34 85 127 132 133 134
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1 2 3 4 5 5 6 6 7 7 8 8 9 10 11 11 12 13 13	20 Brakes not applied correctly	T002B33	I	Flaws in pilot requirements definition process and/or training methodology Poor application of 7/0 & RTO procedure, braking initiation sequence Wildlife incursion Emergency landing Convective weather / turbulence / windshear or crosswind conditions during take-off Bird strike Risk of dangerous occurences appeared during take-off roll Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications	168 199 5 8 32 34 85 127 132 133 134
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Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties 151 Pilot tiredness—Inadequate workload distribution 167 Poor application of 17/0 & RTO procedure, use of MET / ATIS information, aircraft and passive contribution to the PF duties 180 Poor application of 17/0 & RTO procedure, use of MET / ATIS information, aircraft and passive contribution on the PF duties 190 Lack of adherence to AFM limitations for Take-off adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum 191 Take-off rejected correctly when below 191 Take-off rejected correctly when below 191 Take-off rejected correctly when below 191 Take-off rejected correctly when below 191 Lack of adherence to MED and the probability. Toosa22 Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties 191 Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties 191 Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties 191 Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties 191 Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties 191 Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contri	\neg						
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11	10						305
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13	14						203
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4 or / and passive contribution to the PF duties 151 5 Pilot tiredness - Inadequate workload distribution 167 6 Flaws in pilot requirements definition process and/or training methodology 168 7 Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling 200	1			TO03B22	success, but it must be included to obtain the pivotal event	Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased	32
5 Pilot tiredness - Inadequate workload distribution 167 6 Flaws in pilot requirements definition process and/or training methodology 168 Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling 200	1 2			TO03B22	success, but it must be included to obtain the pivotal event	Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate	32 45
Flaws in pilot requirements definition process and/or training methodology 168 Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling 200	1 2			TO03B22	success, but it must be included to obtain the pivotal event	Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	45
Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling 200	1 2 3			TO03B22	success, but it must be included to obtain the pivotal event	Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	45 151
7 handling 200	1 2 3 4 5			TO03B22	success, but it must be included to obtain the pivotal event	Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - inadequate workload distribution	45 151 167
	1 2 3 4 5			TO03B22	success, but it must be included to obtain the pivotal event	Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	45 151
	1 2 3 4 5			T003B22	success, but it must be included to obtain the pivotal event	Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot triedness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft	45 151 167 168
	1 2 3 4 5 6			T003B22	success, but it must be included to obtain the pivotal event	Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling	45 151 167 168 200
	1 2 3 4 5			TO03B22	success, but it must be included to obtain the pivotal event	Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling Lack of adherence to AFM limitations for Take-off	45 151 167 168
	1 2 3 4 5 6			TO03B22	success, but it must be included to obtain the pivotal event	Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling Lack of adherence to AFM limitations for Take-off Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of	45 151 167 168 200
	1 2 3 4 5 6			TO03B22	success, but it must be included to obtain the pivotal event	Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling Lack of adherence to AFM limitations for Take-off	45 151 167 168 200



丁		Base events	Code	Definition	Identifiable precursors	No.
		buse events	Couc	Definition .	Failure to remember / assess crosswind component limit for prevailing runway	
10					condition	418
Ш						
+ 11						
+	III	Failure to maintain control (V <= V1)		No input to controls will allow the pilot to maintain control of the	Failure to maintain control (V <= V1)	
1	7	Uncontrollable	TO03B31	aircraft with speed less than V1	not identifiable at that level	
٦						
2					Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased	32
3					RWY surface friction rate	45
I					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	
4 5					or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution	151 167
6					Flaws in pilot requirements definition process and/or training methodology	168
٦					Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft	
7 8					handling Lack of adherence to AFM limitations for Take-off	200
Ť					Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of	202
					RWY surface condition. Snow / ice presence / or runway surface friction rate below	
9					minimum Failure to remember / assess crosswind component limit for prevailing runway	203
10					condition	418
11					Pilot tiredness - Inadequate workload distribution	167
12					Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP	168
13					decision	207
14					Late rejected takeoff decision / initiation	368
15			-	The pilot makes no attempt to control the size of with sec.	Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations	384
1	8	Lack of control	TO03B32	The pilot makes no attempt to control the aircraft with speed less than V1	Pilot tiredness - Inadequate workload distribution	167
2	Ü	Edek of control	1003532	Wildliff 2	Flaws in pilot requirements definition process and/or training methodology	168
3					Poor application of T/O & RTO procedure, aircraft handling	388
4					Convective weather / turbulence / windshear or crosswind conditions during take-off	32
Ť					Adverse weather in terms of heavy rain or icing conditions resulted with decreased	32
5					RWY surface friction rate	45
6					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
7					Pilot tiredness - Inadequate workload distribution	167
8					Flaws in pilot requirements definition process and/or training methodology	168
9					Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling	200
10					Lack of adherence to AFM limitations for Take-off	200
Ť					Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of	
					RWY surface condition. Snow / ice presence / or runway surface friction rate below	202
11					minimum Failure to remember / assess crosswind component limit for prevailing runway	203
12					condition	418
13					Pilot tiredness - Inadequate workload distribution	167
14					Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP	168
15					decision	207
16					Late rejected takeoff decision / initiation	368
17				The pilot applies incorrect control to the aircraft, which has speed	Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations	384
				less than V1. This can be due to improper training, stress and		
1	9	Incorrect Control	TO03B33	fatigue	Pilot tiredness - Inadequate workload distribution	167
2					Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling	168 388
귀					Proof application of 170 & KTO procedure, aircraft flanding	300
4					Convective weather / turbulence / windshear or crosswind conditions during take-off	32
Ţ					Adverse weather in terms of heavy rain or icing conditions resulted with decreased	
5					RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	45
6					or / and passive contribution to the PF duties	151
7					Pilot tiredness - Inadequate workload distribution	167
8					Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft	168
9					handling	200
10					Lack of adherence to AFM limitations for Take-off	202
					Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below	1
11					minimum	203
寸					Failure to remember / assess crosswind component limit for prevailing runway	
12 13					condition Pilot tiredness - Inadequate workload distribution	418 167
14					Flaws in pilot requirements definition process and/or training methodology	168
T					Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP	
15			1		decision	207
16					Late rejected takeoff decision / initiation Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations	368 384
17				The pilot applies correct measures but are not enough to prevent		
17	10	Insufficient control	TO03B34	aircraft leaving off the side of the runway	Pilot tiredness - Inadequate workload distribution	167
1			I .	I .	Flaws in pilot requirements definition process and/or training methodology	168
1					Poor application of T/O & RTO procedure, aircraft handling	388
1					Poor application of T/O & RTO procedure, aircraft handling	388
1					Poor application of T/O & RTO procedure, aircraft handling Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased	388



		Base events	Code	Definition	Identifiable precursors	No.
					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	
6 7					or / and passive contribution to the PF duties	151 167
8					Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	168
Ť					Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft	
9					handling	200
10					Lack of adherence to AFM limitations for Take-off	202
					Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below	
11					minimum	203
					Failure to remember / assess crosswind component limit for prevailing runway	
12					condition	418
13					Pilot tiredness - Inadequate workload distribution	167
14					Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP	168
15					decision	207
16					Late rejected takeoff decision / initiation	368
17					Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations	384
IV						
Ш						
+ 11						
+1 1	IV	Failure to Achieve Maximum Braking			Failure to Achieve Maximum Braking	
ſ				The runway is too short under wet or icy runway conditions for the		1
,	4.0	Insufficient Dunway Lan-+-	TO02844	plane to come to a halt even if the take-off is aborted before V1 is	Convective weather, heavy rain regulard with wet DMM	
1 2	11	Insufficient Runway Length	TO03B41	reached.	Convective weather - heavy rain resulted with wet RWY surface Pilot tiredness - Inadequate workload distribution	75 167
3					Flaws in pilot requirements definition process and/or training methodology	168
4					Gross error in takeoff weight entry and/or in V1 / VR speeds assessment	179
T					Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of	
					RWY surface condition. Snow / ice presence / or runway surface friction rate below	305
5					minimum	203
6					High energy RTO rate is an indicator of improper Operator's policy for T/O operations.	211
7					Poor application of T/O & RTO procedure, computation of T/O parameters	260
8					Convective weather / turbulence / windshear or crosswind conditions during take-off	32
9					Adverse weather in terms of heavy rain or icing conditions resulted with decreased	45
9					RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	45
10					or / and passive contribution to the PF duties	151
11					Pilot tiredness - Inadequate workload distribution	167
12					Flaws in pilot requirements definition process and/or training methodology	168
					Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft	
13 14					handling Lack of adherence to AFM limitations for Take-off	200
14					Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of	202
					RWY surface condition. Snow / ice presence / or runway surface friction rate below	
15					minimum	203
					Failure to remember / assess crosswind component limit for prevailing runway	
16 17					condition Pilot tiredness - Inadequate workload distribution	418 167
18					Flaws in pilot requirements definition process and/or training methodology	168
					Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP	
19					decision	207
20					Late rejected takeoff decision / initiation	
21 22					Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations	368
23			i e			384
24					Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	
寸					Pilot tiredness - Inadequate workload distribution	384 167
- 1				Brakes are not giving maximum braking, i.e. because of improper	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling	384 167 168
1	12	Brakes not functioning correctly	TO03B42	Brakes are not giving maximum braking, i.e. because of improper maintenance and damages	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling System failure affecting aircraft configuration, controllability and/or flying qualities	384 167 168 388 25
2	12	Brakes not functioning correctly	TO03B42	I as fine the second of the se	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling System failure affecting aircraft configuration, controllability and/or flying qualities Contaminated Runway	384 167 168 388
T	12	Brakes not functioning correctly	TO03B42	I as fine the second of the se	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling System failure affecting aircraft configuration, controllability and/or flying qualities Contaminated Runway Flaws in maintenance technician / airworthiness specialist requirements definition	384 167 168 388 25 39
1 2 3	12	Brakes not functioning correctly	T003B42	I as fine the second of the se	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling System failure affecting aircraft configuration, controllability and/or flying qualities Contaminated Runway	384 167 168 388
	12	Brakes not functioning correctly	T003B42	I as fine the second of the se	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling System failure affecting aircraft configuration, controllability and/or flying qualities Contaminated Runway Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	384 167 168 388 25 39
3	12	Brakes not functioning correctly	T003B42	I as fine the second of the se	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling System failure affecting aircraft configuration, controllability and/or flying qualities Contaminated Runway Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence	384 167 168 388 25 39 149
3	12	Brakes not functioning correctly	T003B42	I as fine the second of the se	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling System failure affecting aircraft configuration, controllability and/or flying qualities Contaminated Runway Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.	384 167 168 388 25 39
3	12	Brakes not functioning correctly	T003B42	I as fine the second of the se	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling System failure affecting aircraft configuration, controllability and/or flying qualities Contaminated Runway Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxing	384 167 168 388 25 39 149 150 216
3 4 5	12	Brakes not functioning correctly	T003842	I as fine the second of the se	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling System failure affecting aircraft configuration, controllability and/or flying qualities Contaminated Runway Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.	384 167 168 388 25 39 149
3 4 5	12	Brakes not functioning correctly	TO03B42	I as fine the second of the se	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling System failure affecting aircraft configuration, controllability and/or flying qualities Contaminated Runway Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake). Convective weather / turbulence / windshear or crosswind conditions during take-off	384 167 168 388 25 39 149 150 216
3 4 5 6	12	Brakes not functioning correctly	TO03B42	I as fine the second of the se	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling System failure affecting aircraft configuration, controllability and/or flying qualities Contaminated Runway Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake). Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased	384 167 168 388 25 39 149 150 216 366
3 4 5	12	Brakes not functioning correctly	TO03B42	I as fine the second of the se	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling System failure affecting aircraft configuration, controllability and/or flying qualities Contaminated Runway Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake). Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate	384 167 168 388 25 39 149 150 216 366
3 4 5 6	12	Brakes not functioning correctly	TO03B42	I as fine the second of the se	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling System failure affecting aircraft configuration, controllability and/or flying qualities Contaminated Runway Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake). Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased	384 167 168 388 25 39 149 150 216 366 32
3 4 5 6 7 8	12	Brakes not functioning correctly	TO03B42	L	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling System failure affecting aircraft configuration, controllability and/or flying qualities Contaminated Runway Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake). Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	384 167 168 388 25 39 149 150 216 366
3 4 5 6 7 8	12	Brakes not functioning correctly	TO03B42	L	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling System failure affecting aircraft configuration, controllability and/or flying qualities Contaminated Runway Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake). Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	384 167 168 388 25 39 149 150 216 366 32 45
3 4 5 6 7 8 9 10 11	12	Brakes not functioning correctly	TO03B42	L	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling System failure affecting aircraft configuration, controllability and/or flying qualities Contaminated Runway Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake). Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft	384 167 168 388 25 39 149 150 216 366 32 45 151 167 168
3 4 5 6 7 8 9 10 11	12	Brakes not functioning correctly	TO03B42	L	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling System failure affecting aircraft configuration, controllability and/or flying qualities Contaminated Runway Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake). Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling	384 167 168 388 25 39 149 150 216 366 32 45 151 167 168
3 4 5 6 7 8 9 10 11	121	Brakes not functioning correctly	TO03B42	L	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling System failure affecting aircraft configuration, controllability and/or flying qualities Contaminated Runway Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist triedness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake). Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling Lack of adherence to AFM limitations for Take-off	384 167 168 388 25 39 149 150 216 366 32 45 151 167 168
3 4 5 6 7 8 9 10 11	121	Brakes not functioning correctly	TO03B42	L	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling System failure affecting aircraft configuration, controllability and/or flying qualities Contaminated Runway Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake). Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling	384 167 168 388 25 39 149 150 216 366 32 45 151 167 168
3 4 5 6 7 8 9 10 11	12	Brakes not functioning correctly	TO03B42	L	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling System failure affecting aircraft configuration, controllability and/or flying qualities Contaminated Runway Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist triedness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake). Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling Lack of adherence to AFM limitations for Take-off Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum	384 167 168 388 25 39 149 150 216 366 32 45 151 167 168
3 4 5 6 7 8 9 10 11 12 13	122	Brakes not functioning correctly	TO03B42	L	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling System failure affecting aircraft configuration, controllability and/or flying qualities Contaminated Runway Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake). Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling Lack of adherence to AFM limitations for Take-off Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum Failure to remember / assess crosswind component limit for prevailing runway	384 167 168 388 25 39 149 150 216 366 32 45 151 167 168 200 202
3 4 5 6 7 8 9 10 11 12 13	12	Brakes not functioning correctly	TO03B42	L	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling System failure affecting aircraft configuration, controllability and/or flying qualities Contaminated Runway Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake). Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling Lack of adherence to AFM limitations for Take-off Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum	384 167 168 388 25 39 149 150 216 366 32 45 151 167 168 200 202 203 418
3 4 5 6 7 8 9 10 11 12 13 14 15 16	12	Brakes not functioning correctly	TO03B42	L	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling System failure affecting aircraft configuration, controllability and/or flying qualities Contaminated Runway Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist triedness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake). Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling Lack of adherence to AFM limitations for Take-off Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum Failure to remember / assess crosswind component limit for prevailing runway condition. Pilot tiredness - Inadequate workload distribution	384 167 168 388 25 39 149 216 366 32 45 151 167 168 200 202 203 418 167
3 4 5 6 7 8 9 10 11 12 13	122	Brakes not functioning correctly	TO03B42	L	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling System failure affecting aircraft configuration, controllability and/or flying qualities Contaminated Runway Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake). Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling Lack of adherence to AFM limitations for Take-off Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum	384 167 168 388 25 39 149 150 216 366 32 45 151 167 168 200 202 203 418



		Base events	Code	Definition	Identifiable precursors	No.
19		base events	Code	Definition	Late rejected takeoff decision / initiation	368
20					Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations	384
21					Pilot tiredness - Inadequate workload distribution	167
22					Flaws in pilot requirements definition process and/or training methodology	168
23					Poor application of T/O & RTO procedure, aircraft handling	388
				Failure of the flight crew to apply all the braking systems		
1	13	Brakes not applied correctly	TO03B43	immediately after take-off rejection.	Pilot tiredness - Inadequate workload distribution	167
2					Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, braking initiation sequence	168 199
3					Poor application of 170 & KTO procedure, braking initiation sequence	199
4					Convective weather / turbulence / windshear or crosswind conditions during take-off	32
H					Adverse weather in terms of heavy rain or icing conditions resulted with decreased	- 52
5					RWY surface friction rate	45
П					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	
6					or / and passive contribution to the PF duties	151
7					Pilot tiredness - Inadequate workload distribution	167
8					Flaws in pilot requirements definition process and/or training methodology	168
					Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft	
9					handling	200
10					Lack of adherence to AFM limitations for Take-off	202
					Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of	
					RWY surface condition. Snow / ice presence / or runway surface friction rate below	200
11					minimum Tribuse to remember / assess gresswind component limit for provailing running	203
12					Failure to remember / assess crosswind component limit for prevailing runway	410
12 13					condition Pilot tiredness - Inadequate workload distribution	418 167
14			 		Flaws in pilot requirements definition process and/or training methodology	168
-7					Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP	200
15					decision	207
16					Late rejected takeoff decision / initiation	368
17			i e		Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations	384
18					Pilot tiredness - Inadequate workload distribution	167
19					Flaws in pilot requirements definition process and/or training methodology	168
20					Poor application of T/O & RTO procedure, aircraft handling	388
۷+						
	V	Failure to maintain control			Failure to maintain control	
				No input to controls will allow the pilot to maintain control of the		
1	14	Uncontrollable	TO03B51	aircraft when take-off continued	not identifiable at the moment	
2					Convective weather / turbulence / windshear or crosswind conditions during take-off	32
					Adverse weather in terms of heavy rain or icing conditions resulted with decreased	
3					RWY surface friction rate	45
					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	
4					or / and passive contribution to the PF duties	151
5 6					Pilot tiredness - Inadequate workload distribution	167 168
ь					Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft	108
7					handling	200
8					Lack of adherence to AFM limitations for Take-off	202
H					Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of	
					RWY surface condition. Snow / ice presence / or runway surface friction rate below	
9					minimum	203
П					Failure to remember / assess crosswind component limit for prevailing runway	
10					condition	418
				The pilot makes no attempt to control the aircraft when take-off		
1	15	Lack of control	TO03B52	continued	Pilot tiredness - Inadequate workload distribution	167
2					Flaws in pilot requirements definition process and/or training methodology	168
3					Poor application of T/O & RTO procedure, aircraft handling	388
4					Convective weather / turbulence / windshear or crosswind conditions during take-off	22
4					Adverse weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased	32
5					RWY surface friction rate	45
٦					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	+3
6					or / and passive contribution to the PF duties	151
7			İ		Pilot tiredness - Inadequate workload distribution	167
8					Flaws in pilot requirements definition process and/or training methodology	168
П					Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft	
9					handling	200
10					Lack of adherence to AFM limitations for Take-off	202
					Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of	
Ш					RWY surface condition. Snow / ice presence / or runway surface friction rate below	
11			-		minimum	203
			1		Failure to remember / assess crosswind component limit for prevailing runway condition	418
12			1		recondition .	418
12				The nilot applies incorrect control to the aircraft when take off		
	16	Incorrect Control	T003B53	The pilot applies incorrect control to the aircraft when take-off	Pilot tiredness - Inadequate workload distribution	167
1	16	Incorrect Control	TO03B53	The pilot applies incorrect control to the aircraft when take-off continued. This can be due to improper training, stress and fatigue	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168
1	16	Incorrect Control	TO03B53		Flaws in pilot requirements definition process and/or training methodology	168
1	16	Incorrect Control	TO03B53			
1	16	Incorrect Control	TO03B53		Flaws in pilot requirements definition process and/or training methodology	168
1 2 3	16	Incorrect Control	TO03B53		Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling	168 388
1 2 3	16	Incorrect Control	T003B53		Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling Convective weather / turbulence / windshear or crosswind conditions during take-off	168 388
1 2 3	16	Incorrect Control	T003B53		Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased	168 388 32
1 2 3 4 5	16	Incorrect Control	T003B53		Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	168 388 32 45
1 2 3 4 5 6	16	Incorrect Control	T003B53		Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution	168 388 32 45 151 167
1 2 3 4 5	16	Incorrect Control	TO03B53		Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	168 388 32 45
1 2 3 4 5 6 7 8	16	Incorrect Control	TO03853		Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft	168 388 32 45 151 167 168
1 2 3 4 5 6 7 8	16	Incorrect Control	T003B53		Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling	168 388 32 45 151 167 168 200
1 2 3 4 5 6 7 8	16	Incorrect Control	T003B53		Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling Lack of adherence to AFM limitations for Take-off	168 388 32 45 151 167 168
1 2 3 4 5 6 7 8	16	Incorrect Control	TO03B53		Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling	168 388 32 45 151 167 168 200



		Base events	Code	Definition	Identifiable precursors	No.
П					Failure to remember / assess crosswind component limit for prevailing runway	
12			-	The pilot applies correct measures but are not enough to prevent	condition	418
1	17	Insufficient control	TO03B54	aircraft leaving off the side of the runway	Pilot tiredness - Inadequate workload distribution	167
2					Flaws in pilot requirements definition process and/or training methodology	168
3			-		Poor application of T/O & RTO procedure, aircraft handling	388
4					Convective weather / turbulence / windshear or crosswind conditions during take-off	32
П					Adverse weather in terms of heavy rain or icing conditions resulted with decreased	
5					RWY surface friction rate	45
6					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
7			<u> </u>		Pilot tiredness - Inadequate workload distribution	167
8					Flaws in pilot requirements definition process and/or training methodology	168
9					Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling	200
10			<u> </u>		Lack of adherence to AFM limitations for Take-off	202
					Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of	П
11					RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum	203
11					Failure to remember / assess crosswind component limit for prevailing runway	203
12					condition	418
1	1	Directional control systems failure	TO04D111	Failure of any part of the main goar	Directional control systems failure	25
2	1	Main Gear Failure	TO04B111	Failure of any part of the main gear	System failure affecting aircraft configuration, controllability and/or flying qualities Tire burst	80
H					Flaws in maintenance technician / airworthiness specialist requirements definition	
3					process and/or training methodology	149
4					Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
H						130
					Inadequate certification process and / or flaws in methodology concerning verification	
5 6					of the system / product compliance with requirements - Landing gear components Flaws in aircraft system maintenance process definition - Landing gear components.	358 377
7					Flaws in manufacturer quality control process - Landing gear components.	376
1	2	Nose Gear Failure	TO04B112	Failure of any part of the nose gear including the steering system	System failure affecting aircraft configuration, controllability and/or flying qualities	25
2					Tire burst	80
3					Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
Ť					Maintenance technician / airworthiness specialist tiredness - Inadequate workload	Ħ
4					distribution	150
					Inadequate certification process and / or flaws in methodology concerning verification	
5					of the system / product compliance with requirements - Landing gear components	358
6					Flaws in aircraft system maintenance process definition - Landing gear components.	377
7			-	Failure in any control the banks of the bank	Flaws in manufacturer quality control process - Landing gear components.	376
				Failure in any part of the brake system that results in asymmetric braking force being applied to the wheels and hence causes		
1	3	Brake System Failure	TO04B121	directional instability	System failure affecting aircraft configuration, controllability and/or flying qualities	25
					Flaws in maintenance technician / airworthiness specialist requirements definition	440
2					process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	149
3					distribution	150
					Inadequate certification process and / or flaws in methodology concerning verification	
4					of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake)	196
H					Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing	130
5					control related system and components (incl. brake).	366
6					Flaws in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake).	365
1	4	Tyre Failure	TO04B122	Failure of a tyre, i.e. bursting or delamination	System failure affecting aircraft configuration, controllability and/or flying qualities	25
2					Tire burst	80
\prod					Flaws in maintenance technician / airworthiness specialist requirements definition	1
3					process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	149
4					distribution	150
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5					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
6					Flaws in aircraft system maintenance process definition - Landing gear components.	377
7					Flaws in manufacturer quality control process - Landing gear components.	376
	-	Whool Sub Assambly Failure	TO04P122	Failure of any part of the wheel excluding tyre or braking system,	Sustain failure affecting aircraft configuration, controllability and failure are like-	25
1 2	5	Wheel Sub-Assembly Failure	TO04B123	i.e. an axle failure or wheel rim failure	System failure affecting aircraft configuration, controllability and/or flying qualities Tire burst	25 80
					Flaws in maintenance technician / airworthiness specialist requirements definition	
3					process and/or training methodology	149
4					Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
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5 6					of the system / product compliance with requirements - Landing gear components Flaws in aircraft system maintenance process definition - Landing gear components.	358 377
7					Flaws in manufacturer quality control process - Landing gear components.	376
H +						H
H	II	Take-off rejection		The pilot either fails to realise the directional control system failure	Take-off rejection	\vdash
				is the cause of the handling problems or diagnoses the failure as		
				something else, perhaps more serious and as a result aborts the		
1	6	Pilot Misdiagnosis	TO04B211	take-off.	Pilot tiredness - Inadequate workload distribution	167
3					Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, failure recognition and preparedness	168 209
4					System failure affecting aircraft configuration, controllability and/or flying qualities	25
5					Tire burst	80



		Base events	Code	Definition I	Identifiable precursors Flaws in maintenance technician / airworthiness specialist requirements definition	No.
6					process and/or training methodology	149
					Maintenance technician / airworthiness specialist tiredness - Inadequate workload	
7					distribution Inadequate certification process and / or flaws in methodology concerning verification	150
					of the system / product compliance with requirements - marshalling/rolling/taxing	
8					control related system and components (incl. brake)	196
					Inadequate certification process and / or flaws in methodology concerning verification	
9					of the system / product compliance with requirements - Landing gear components	358
10					Flaws in aircraft system maintenance process definition - Landing gear components.	377
11					Flaws in manufacturer quality control process - Landing gear components.	376
12					Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake).	366
					Flaws in manufacturer quality control process - marshalling/rolling/taxiing control	500
13					related system and components (incl. brake).	365
				The pilot diagnoses the situation, realising that a directional control related system failure has resulted in handling problems but		
1	7	Pilot Misjudgement	TO04B212	misjudges the situation and incorrectly aborts the take-off.	Pilot tiredness - Inadequate workload distribution	167
2					Flaws in pilot requirements definition process and/or training methodology	168
3					Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207
4					System failure affecting aircraft configuration, controllability and/or flying qualities	25
5					Tire burst	80
					Flaws in maintenance technician / airworthiness specialist requirements definition	
6					process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	149
7					distribution	150
П					Inadequate certification process and / or flaws in methodology concerning verification	
8					of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake)	196
•					control related system and components (incl. brake)	190
					Inadequate certification process and / or flaws in methodology concerning verification	
9					of the system / product compliance with requirements - Landing gear components	358
10 11					Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components.	377 376
					Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing	370
12					control related system and components (incl. brake).	366
13					Flaws in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake).	365
13				If the take-off is rejected when the aircraft is below V1 then this is a	related system and components (inci. brake).	303
		Take-off rejected correctly when below		success, but it must be included to obtain the pivotal event		
1	8	V1	TO04B22	probability.	not identifiable at that lelvel	
2					System failure affecting aircraft configuration, controllability and/or flying qualities Tire burst	25 80
_					Flaws in maintenance technician / airworthiness specialist requirements definition	- 00
4					process and/or training methodology	149
5					Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
_ 3					Inadequate certification process and / or flaws in methodology concerning verification	
					of the system / product compliance with requirements - marshalling/rolling/taxiing	
6					control related system and components (incl. brake)	196
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7					of the system / product compliance with requirements - Landing gear components	358
8					Flaws in aircraft system maintenance process definition - Landing gear components.	377
9					Flaws in manufacturer quality control process - Landing gear components. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing	376
10					control related system and components (incl. brake).	366
П					Flaws in manufacturer quality control process - marshalling/rolling/taxiing control	П
11					related system and components (incl. brake).	365
ш						
+ 11		Failure to maintain control (take-off				
+1	Ш	rejected)		No input to controls will allow the pilot to maintain control of the	Failure to maintain control (take-off rejected)	Н
1	9	Uncontrollable	TO04B31	No input to controls will allow the pilot to maintain control of the aircraft with speed less than V1	not identifiable at the moment	
2				, , , , , , , , , , , , , , , , , , ,	System failure affecting aircraft configuration, controllability and/or flying qualities	25
3					Tire burst	80
4					Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
H					Maintenance technician / airworthiness specialist tiredness - Inadequate workload	1
5					distribution	150
					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing	
6					control related system and components (incl. brake)	196
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7					Inadequate certification process and / or flaws in methodology concerning verification	
7 8					of the system / product compliance with requirements - Landing gear components Flaws in aircraft system maintenance process definition - Landing gear components.	358 377
9					Flaws in manufacturer quality control process - Landing gear components.	376
10					Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing	365
10					control related system and components (incl. brake). Flaws in manufacturer quality control process - marshalling/rolling/taxiing control	366
11					related system and components (incl. brake).	365
12					Pilot tiredness - Inadequate workload distribution	167
13					Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP	168
14					decision	207
15					Poor application of T/O & RTO procedure, failure recognition and preparedness	209
1	10	Lack of control	TO04B32	The pilot makes no attempt to control the aircraft with speed less than V1	Pilot tiredness - Inadequate workload distribution	167
1	10			production of the control of the con		



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		13	insumcient Kunway Length	1001011			
	2	13	msunicient Kunway Length	1001512			



		Base events	Code	Definition	Identifiable precursors	No
					Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of	
5					RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum	20
5					minimum	20
6					High energy RTO rate is an indicator of improper Operator's policy for T/O operations.	. 21
7					Poor application of T/O & RTO procedure, computation of T/O parameters	26
8					System failure affecting aircraft configuration, controllability and/or flying qualities	2
9					Tire burst	8
					Flaws in maintenance technician / airworthiness specialist requirements definition	١.,
10					process and/or training methodology	14
11					Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	15
11			+		Inadequate certification process and / or flaws in methodology concerning verification	
					of the system / product compliance with requirements - marshalling/rolling/taxing	1
12					control related system and components (incl. brake)	19
					Inadequate certification process and / or flaws in methodology concerning verification	
13					of the system / product compliance with requirements - Landing gear components	35
14					Flaws in aircraft system maintenance process definition - Landing gear components.	37
15			+		Flaws in manufacturer quality control process - Landing gear components.	37
16					Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake).	36
10			+		Flaws in manufacturer quality control process - marshalling/rolling/taxiing control	+
١7					related system and components (incl. brake).	36
.8					Pilot tiredness - Inadequate workload distribution	16
19					Flaws in pilot requirements definition process and/or training methodology	16
					Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP	
0			1		decision	20
1					Poor application of T/O & RTO procedure, failure recognition and preparedness	20
2			+		Pilot tiredness - Inadequate workload distribution	16
23 24			+	+	Flaws in pilot requirements definition process and/or training methodology	38
.4			+	Brakes are not giving maximum braking, e.g. because of improper	Poor application of T/O & RTO procedure, aircraft handling	38
1	14	Brakes not functioning correctly	TO04B42	maintenance and damages	System failure affecting aircraft configuration, controllability and/or flying qualities	2
2		Brakes not ranctioning correctly	1001512	manitematica and damages	Contaminated Runway	1
					Flaws in maintenance technician / airworthiness specialist requirements definition	T
3					process and/or training methodology	14
					Maintenance technician / airworthiness specialist tiredness - Inadequate workload	Т
4					distribution	15
					Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence	
5					of contaminations.	21
_					Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing	1,
7			+		control related system and components (incl. brake). System failure affecting aircraft configuration, controllability and/or flying qualities	36
8			+		Tire burst	- 2
Ü			_		Flaws in maintenance technician / airworthiness specialist requirements definition	+
9					process and/or training methodology	14
T					Maintenance technician / airworthiness specialist tiredness - Inadequate workload	Т
LO					distribution	15
					Inadequate certification process and / or flaws in methodology concerning verification	n
					of the system / product compliance with requirements - marshalling/rolling/taxiing	
11					control related system and components (incl. brake)	19
12					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	35
.3			+		Flaws in aircraft system maintenance process definition - Landing gear components.	37
4					Flaws in manufacturer quality control process - Landing gear components.	37
Π					Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing	Ť
15			<u> </u>		control related system and components (incl. brake).	36
					Flaws in manufacturer quality control process - marshalling/rolling/taxiing control	Т
۱6			1		related system and components (incl. brake).	36
.7			1		Pilot tiredness - Inadequate workload distribution	16
18			+		Flaws in pilot requirements definition process and/or training methodology	16
9			1		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	20
9			+		Poor application of T/O & RTO procedure, failure recognition and preparedness	20
1			+		Pilot tiredness - Inadequate workload distribution	16
22					Flaws in pilot requirements definition process and/or training methodology	16
23			1		Poor application of T/O & RTO procedure, aircraft handling	38
				Failure of the flight crew to apply all the braking systems		Т
1	15	Brakes not applied correctly	TO04B43	immediately after take-off rejection.	Pilot tiredness - Inadequate workload distribution	16
2		-			Flaws in pilot requirements definition process and/or training methodology	16
3			1		Poor application of T/O & RTO procedure, braking initiation sequence	19
4			+		System failure affecting aircraft configuration, controllability and/or flying qualities	1
5			+		Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition	8
6			1		process and/or training methodology	14
_			1		Maintenance technician / airworthiness specialist tiredness - Inadequate workload	+
7			1		distribution	15
T					Inadequate certification process and / or flaws in methodology concerning verification	
			1		of the system / product compliance with requirements - marshalling/rolling/taxiing	
8			1		control related system and components (incl. brake)	19
1						1
			1		Inadequate certification process and / or flaws in methodology concerning verification	
9			1		of the system / product compliance with requirements - Landing gear components	3!
1			+	+	Flaws in aircraft system maintenance process definition - Landing gear components.	37
1			+	+	Flaws in manufacturer quality control process - Landing gear components. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing	37
			1		control related system and components (incl. brake).	36
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12					Flaws in manufacturer quality control process - marshalling/rolling/taxiing control	
12 13					Flaws in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake).	36



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Vision V							168
Learner transport of the control plane of the contr			Failure to Basintoir control (tallo off			Poor application of T/O & RTO procedure, aircraft handling	388
1 El prisocratibles TOMASS T		.,				Enilure to Maintain central (take off centinued)	
a recommendation of the commendation	continued)		No input to controls will allow the pilot to maintain control of the	railure to Maintain control (take-on continueu)	\vdash		
Service for the service effective entered configuration, controlled seat of the programmine. For built For b	1	16	Uncontrollable	TO04B51		not identifiable at that level	
The barrier Park in maniferance technical placement regulatement specials requirements definition Park in maniferance technical placements requirements definition Park in maniferance technical placements requirements definition Park in maniferance technical placements requirements definition Park in maniferance technical placements of plac	-		Oncommondate.	1001001	an ordina		25
process and part variety embeddings of the control							80
Networkstrate statement in present trades and interesting and interesting and interesting of the speak of product complanes and interesting an	П					Flaws in maintenance technician / airworthiness specialist requirements definition	П
services of the control of the contr	4					process and/or training methodology	149
and control of the co						Maintenance technician / airworthiness specialist tiredness - Inadequate workload	П
of the system of product complane with reconserved. The system of section of leading for the section of product complane with reconserved section of the system of the section of product complane with reconserved. Section of the system of th	5						150
de control rained speem and components (put I brake) Part							4
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Second Content Seco	6					control related system and components (incl. brake)	196
Second Content Seco							
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Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing							376
							+
[Control related system and components (Incl. brake).	12					control related system and components (incl. brake).	366



	Base events	Code	Definition	Identifiable precursors	No.
13				Flaws in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake).	365
I	Incorrect configuration			Incorrect configuration	505
			Co-pilot fails to determine the position of the flap and slats required	1	П
1 :	1 Unsuccessful TO configuration checklist	TO05B111	for a successful take-off	Pilot tiredness - Inadequate workload distribution	167
2				Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft	168
3				configuration.	198
4				Incorrect stab-trim setting	258
5				Undetected incorrect takeoff configuration	259
			Captain fails to identify the incorrect position of the flap and slats		
1	2 Unsuccessful Checklist Verification	TO05B112	determined by co-pilot	Pilot tiredness - Inadequate workload distribution	167
2				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
3				Flaws in pilot requirements definition process and/or training methodology	168
			Co-pilot fails to enter the correct flap and slat settings into the FMC		
	Flap & slat positions entered into FMC		that the aircraft is incorrectly configured prior to push-back from		
	3 incorrectly	TO05B12	the stand	Unintuitive and / or error prone system manual - FMC	217
2				Pilot tiredness - Inadequate workload distribution	167
3			Contain faile to confirm the table off confirmation about minute	Flaws in pilot requirements definition process and/or training methodology	168
	4 Verification not conducted	TO05B21	Captain fails to perform the take-off configuration check prior to the application of take-off power	Pilot tiredness - Inadequate workload distribution	167
2	4 Vernication not conducted	1003821	the application of take-on power	Flaws in pilot requirements definition process and/or training methodology	168
1				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	100
3				or / and passive contribution to the PF duties	151
				Lack of adherence to SOP for take-off procedure in terms of checking take-off	
4				configuration before application of take-off power.	201
	E Varification unques ful	TOOFBAA	Captain performs the take-off configuration check but fails to notice		1.5
2	5 Verification unsuccessful	TO05B22	that the aircraft is configured incorrectly.	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168
 	Take-off configuration warning		+	Take-off configuration warning	108
			TOCW system fails due to unsuccessful manufacture and hence the	Inadequate certification process and / or flaws in methodology concerning verification	\vdash
1 (6 Unsuccessful Manufacture	TO05B311	take-off is not rejected	of the system / product compliance with requirements - TOCW System	229
2				Flaws in manufacturer quality control process - TOCW system components	222
3				System failure affecting aircraft configuration, controllability and/or flying qualities	25
				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	454
4			 	or / and passive contribution to the PF duties	151
6			+	Unintuitive and / or error prone system manual - ground radar. Unintuitive and / or error prone system manual - FMC	164 217
7			+	Flaws in pilot requirements definition process and/or training methodology	168
				Lack of adherence to SOP for take-off procedure in terms of determining of aircraft	
8				configuration.	198
				Lack of adherence to SOP for take-off procedure in terms of checking take-off	
9				configuration before application of take-off power.	201
10				Incorrect stab-trim setting	258
11			TOCW system fails due to unsuccessful maintenance and hence the	Undetected incorrect takeoff configuration Flaws in maintenance technician / airworthiness specialist requirements definition	259
. 1	7 Unsuccessful Maintenance	TO05B312	take-off is not rejected	process and/or training methodology	149
			,	Maintenance technician / airworthiness specialist tiredness - Inadequate workload	Ħ
2				distribution	150
3				Flaws in aircraft system maintenance process definition - TOCW System	204
4				System failure affecting aircraft configuration, controllability and/or flying qualities	25
				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
6			<u> </u>	Unintuitive and / or error prone system manual - FMC	217
7				Pilot tiredness - Inadequate workload distribution	167
8				Flaws in pilot requirements definition process and/or training methodology	168
				Lack of adherence to SOP for take-off procedure in terms of determining of aircraft	
9					
. 1		 		configuration.	198
10				Lack of adherence to SOP for take-off procedure in terms of checking take-off	198
10				Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	198 201
11				Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting	198 201 258
11 12			TOCW system fails because the flight crew operate it incorrectly. This includes the failure of the flight crew to check that the TOCW is working prior to taxi or the failure of the crew to reset the TOCW	Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim settling Undetected incorrect takeoff configuration	198 201 258 259
11 12 1	8 Unsuccessful Operation	T005B313	This includes the failure of the flight crew to check that the TOCW is	Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration Incorrect use of automation - TOCW System	198 201 258 259
11 12 1 2	8 Unsuccessful Operation	T005B313	This includes the failure of the flight crew to check that the TOCW is working prior to taxi or the failure of the crew to reset the TOCW	Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration Incorrect use of automation - TOCW System Pilot tiredness - Inadequate workload distribution	198 201 258 259 192 167
11 12 1	8 Unsuccessful Operation	T005B313	This includes the failure of the flight crew to check that the TOCW is working prior to taxi or the failure of the crew to reset the TOCW	Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration Incorrect use of automation - TOCW System Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	198 201 258 259
11 12 1 2	8 Unsuccessful Operation	TO05B313	This includes the failure of the flight crew to check that the TOCW is working prior to taxi or the failure of the crew to reset the TOCW	Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration Incorrect use of automation - TOCW System Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	198 201 258 259 192 167 168
11 12 1 2	8 Unsuccessful Operation	TO05B313	This includes the failure of the flight crew to check that the TOCW is working prior to taxi or the failure of the crew to reset the TOCW	Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration Incorrect use of automation - TOCW System Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	198 201 258 259 192 167 168
11 12 1 2 3	8 Unsuccessful Operation	TO05B313	This includes the failure of the flight crew to check that the TOCW is working prior to taxi or the failure of the crew to reset the TOCW	Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration Incorrect use of automation - TOCW System Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	198 201 258 259 192 167 168
11 12 1 2 3	8 Unsuccessful Operation	T005B313	This includes the failure of the flight crew to check that the TOCW is working prior to taxi or the failure of the crew to reset the TOCW	Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration Incorrect use of automation - TOCW System Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - TOCW	198 201 258 259 192 167 168
11 12 1 1 2 2 3 4 5 6	8 Unsuccessful Operation	TO05B313	This includes the failure of the flight crew to check that the TOCW is working prior to taxi or the failure of the crew to reset the TOCW	Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration Incorrect use of automation - TOCW System Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - TOCW Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC	198 201 258 259 192 167 168 151 219
11 12 1 2 3 4 5 6 7	8 Unsuccessful Operation	TO05B313	This includes the failure of the flight crew to check that the TOCW is working prior to taxi or the failure of the crew to reset the TOCW	Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration Incorrect use of automation - TOCW System Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - TOCW Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution	198 201 258 259 192 167 168 151 219 151 217
11 12 1 1 2 2 3 4 5 6	8 Unsuccessful Operation	TO05B313	This includes the failure of the flight crew to check that the TOCW is working prior to taxi or the failure of the crew to reset the TOCW	Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration Incorrect use of automation - TOCW System Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - TOCW Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	198 201 258 259 192 167 168 151 219
11 12 1 2 3 4 5 6 7 7 8 8	8 Unsuccessful Operation	TO05B313	This includes the failure of the flight crew to check that the TOCW is working prior to taxi or the failure of the crew to reset the TOCW	Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect slab-trim setting Undetected incorrect takeoff configuration Incorrect use of automation - TOCW System Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or/ and passive contribution to the PF duties Unintuitive and / or error prone system manual - TOCW Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or/ and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft	198 201 258 259 192 167 168 151 219 151 217 167 168
11 12 1 2 3 4 5 6 7	8 Unsuccessful Operation	TO05B313	This includes the failure of the flight crew to check that the TOCW is working prior to taxi or the failure of the crew to reset the TOCW	Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration Incorrect use of automation - TOCW System Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - TOCW Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.	198 201 258 259 192 167 168 151 219 151 217
11 12 1 2 3 4 5 6 7 7 8 8	8 Unsuccessful Operation	TO05B313	This includes the failure of the flight crew to check that the TOCW is working prior to taxi or the failure of the crew to reset the TOCW	Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect slab-trim setting Undetected incorrect takeoff configuration Incorrect use of automation - TOCW System Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or/ and passive contribution to the PF duties Unintuitive and / or error prone system manual - TOCW Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or/ and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft	198 201 258 259 192 167 168 151 219 151 217 167 168
11 12 1 2 3 4 5 6 7 8 9	8 Unsuccessful Operation	TO05B313	This includes the failure of the flight crew to check that the TOCW is working prior to taxi or the failure of the crew to reset the TOCW	Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration Incorrect use of automation - TOCW System Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - TOCW Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off	198 201 258 259 192 167 168 151 219 151 217 168 198
11 12 2 2 3 4 5 6 7 8 8 9	8 Unsuccessful Operation	TO05B313	This includes the failure of the flight crew to check that the TOCW is working prior to taxi or the failure of the crew to reset the TOCW circuit breaker following testing	Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect slab-trim setting Undetected incorrect takeoff configuration Incorrect use of automation - TOCW System Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - TOCW Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.	198 201 258 259 192 167 168 151 217 167 168 198
11 12 2 3 4 5 5 6 7 8 8 9 9 10 11 12 13 13			This includes the failure of the flight crew to check that the TOCW is working prior to taxi or the failure of the crew to reset the TOCW circuit breaker following testing	Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration Incorrect use of automation - TOCW System Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PP duties Unintuitive and / or error prone system manual - TOCW Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PP duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration	198 201 258 259 192 167 168 151 219 151 217 167 168 198 201 258 259
11 12 2 3 4 5 6 7 7 8 9 9 10 11 12 13 13	8 Unsuccessful Operation 9 Unsuccessful Manufacture	TO05B313	This includes the failure of the flight crew to check that the TOCW is working prior to taxi or the failure of the crew to reset the TOCW circuit breaker following testing	Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration Incorrect use of automation - TOCW System Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - TOCW Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration	198 201 258 259 192 167 168 151 219 151 217 166 198 201 258 259 238
11 12 2 3 4 5 5 6 7 8 8 9 9 10 11 12 13 13			This includes the failure of the flight crew to check that the TOCW is working prior to taxi or the failure of the crew to reset the TOCW circuit breaker following testing	Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration Incorrect use of automation - TOCW System Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - TOCW Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration Flaws in manufacturer quality control process - Power supply system components inadequate certification process and / or flaws in methodology concerning verification in methodology concerning verification	198 201 258 259 192 167 168 151 219 151 217 166 198 201 258 259 238
11 12 2 3 4 5 5 6 7 8 8 9 9 10 11 12 13 13			This includes the failure of the flight crew to check that the TOCW is working prior to taxi or the failure of the crew to reset the TOCW circuit breaker following testing	Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration Incorrect use of automation - TOCW System Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - TOCW Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration	198 201 258 259 192 167 168 151 219 151 167 168 291 291 192 219 221 221 221 221
11 12 2 3 4 5 5 6 7 8 8 9 9 10 11 12 13 13			This includes the failure of the flight crew to check that the TOCW is working prior to taxi or the failure of the crew to reset the TOCW circuit breaker following testing	Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration Incorrect use of automation - TOCW System Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - TOCW Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration Flaws in manufacturer quality control process - Power supply system components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system	198 201 258 259 192 167 168 151 219 151 217 166 198 201 258 259 238
11 12 2 3 4 5 5 6 7 8 8 9 9 10 11 12 13 13			This includes the failure of the flight crew to check that the TOCW is working prior to taxi or the failure of the crew to reset the TOCW circuit breaker following testing	Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration Incorrect use of automation - TOCW System Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - TOCW Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration Flaws in manufacturer quality control process - Power supply system components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components	198 201 258 259 192 167 168 151 219 151 167 168 291 291 192 219 221 221 221 221



		Pasa quants	Code	Definition	Identifiable precursors	No
5		Base events	Code	Definition	Unintuitive and / or error prone system manual - FMC	No. 217
6					Pilot tiredness - Inadequate workload distribution	167
7					Flaws in pilot requirements definition process and/or training methodology	168
					Lack of adherence to SOP for take-off procedure in terms of determining of aircraft	
8					configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off	198
9					configuration before application of take-off power.	201
10					Incorrect stab-trim setting	258
11					Undetected incorrect takeoff configuration	259
П				TOCW power supply fails due to unsuccessful maintenance and	Flaws in maintenance technician / airworthiness specialist requirements definition	
1	10	Unsuccessful Maintenance	TO05B322	hence the take-off is not rejected	process and/or training methodology	149
					Maintenance technician / airworthiness specialist tiredness - Inadequate workload	
2					distribution	150
3					Flaws in aircraft system maintenance process definition - Electrical wiring System System failure affecting the operation of primary instruments / displays or standby	252
4					instruments	26
H					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	
5					or / and passive contribution to the PF duties	151
6					Unintuitive and / or error prone system manual - FMC	217
7					Pilot tiredness - Inadequate workload distribution	167
8					Flaws in pilot requirements definition process and/or training methodology	168
9					Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.	198
3					Lack of adherence to SOP for take-off procedure in terms of checking take-off	130
10			1		configuration before application of take-off power.	201
11			İ		Incorrect stab-trim setting	258
12					Undetected incorrect takeoff configuration	259
ΙТ		Aircraft takes-off with incorrect				
1	11	configuration	TO05B33	Aircraft is still able to take-off even with the incorrect configuration		ш
2			1		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	154
3			 		Unintuitive and / or error prone system manual - FMC	151 217
4			 		Pilot tiredness - Inadequate workload distribution	167
5					Flaws in pilot requirements definition process and/or training methodology	168
П					Lack of adherence to SOP for take-off procedure in terms of determining of aircraft	
6					configuration.	198
					Lack of adherence to SOP for take-off procedure in terms of checking take-off	
7					configuration before application of take-off power.	201
8 9					Incorrect stab-trim setting Undetected incorrect takeoff configuration	258 259
) +					ondetected incorrect takeon configuration	259
	III	Flight crew rejects take-off			Flight crew rejects take-off	
Н				The pilot misdiagnoses the situation and misunderstands the		
				warning and allows the aircraft to reach V1 before incorrectly	Cautions / warnings (genuine or spurious) that may lead to a low-speed or high-	
1	12	Pilot Misdiagnosis	TO05B411	aborting the take-off	speed rejected take-off	46
					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	
2					or / and passive contribution to the PF duties	151
3 4					Pilot tiredness - Inadequate workload distribution	167 168
4					Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP	100
5					decision	207
					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	
6					or / and passive contribution to the PF duties	151
7					Unintuitive and / or error prone system manual - FMC	217
8					Pilot tiredness - Inadequate workload distribution	167
9					Flaws in pilot requirements definition process and/or training methodology	168
10					Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.	198
10					Lack of adherence to SOP for take-off procedure in terms of checking take-off	130
11			1		configuration before application of take-off power.	201
12					Incorrect stab-trim setting	258
13					Undetected incorrect takeoff configuration	259
ιТ				The pilot diagnoses the TOCW but misjudges the situation and		
ارا		Dilat Misjudga	TO050443		Cautions / warnings (genuine or spurious) that may lead to a low-speed or high-	
2	13	Pilot Misjudgement	TO05B412	off	speed rejected take-off Pilot tiredness - Inadequate workload distribution	46 167
3			 		Flaws in pilot requirements definition process and/or training methodology	168
H			 		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP	100
4		l .	1	İ	decision	207
П						207
5					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	207
					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
6					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC	151 217
6 7					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution	151 217 167
6					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	151 217
6 7 8					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft	151 217 167 168
6 7					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.	151 217 167
6 7 8					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft	151 217 167 168
6 7 8 9 10 11					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting	151 217 167 168 198 201 258
6 7 8 9					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pillot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	151 217 167 168 198
6 7 8 9 10 11				If the take-off is rejected when the aircraft is below V1 then this is a	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting	151 217 167 168 198 201 258
6 7 8 9 10 11		Take-off rejected correctly when below	TONEDA	success, but it must be included to obtain the pivotal event	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration	151 217 167 168 198 201 258
6 7 8 9 10 11	14	Take-off rejected correctly when below V1	T005842		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-tim setting Undetected incorrect takeoff configuration	151 217 167 168 198 201 258
6 7 8 9 10 11 12	14		TO05842	success, but it must be included to obtain the pivotal event	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration not identifiable at the moment Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151 217 167 168 198 201 258 259
6 7 8 9 10 11 12	14		T005842	success, but it must be included to obtain the pivotal event	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-tim setting Undetected incorrect takeoff configuration	151 217 167 168 198 201 258
9 10 11 12	14		T005B42	success, but it must be included to obtain the pivotal event	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration not identifiable at the moment Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151 217 167 168 198 201 258 259
6 7 8 9 10 11 12 1	14		T005B42	success, but it must be included to obtain the pivotal event	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration not identifiable at the moment Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	151 217 167 168 198 201 258 259 151
6 7 8 9 10 11 12 1 2 3 4 5	14		T005842	success, but it must be included to obtain the pivotal event	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration before application of take-off power. Incorrect takeoff configuration before application of take-off power. Incorrect takeoff configuration workload incorrect takeoff configuration workload incorrect takeoff configuration workload incorrect takeoff configuration workload adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft	151 217 167 168 198 201 258 259 151 217 167 168
10 11 12 2 3 4	14		T005B42	success, but it must be included to obtain the pivotal event	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration not identifiable at the moment Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	151 217 167 168 198 201 258 259 151 217 167



-				Incorrect stab-trim setting Undetected incorrect takeoff configuration	258 259
				ondetected incorrect takeon configuration	259
	Failure to achieve maximum braking		The runway is too short under wet or icy runway conditions for the	Failure to achieve maximum braking	H
			plane to come to a halt even if the take-off is aborted before V1 is	Adverse weather in terms of heavy rain or icing conditions resulted with decreased	
15	Insufficient Runway Length	TO05B51	reached.	RWY surface friction rate	45
				Pilot tiredness - Inadequate workload distribution	167 168
					100
				handling	200
					'
					203
				Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of	
				RWY surface condition. Snow / ice presence / or runway surface friction rate below	'
_				minimum	203
				High energy RTO rate is an indicator of improper Operator's policy for T/O operations.	211
				Gross error in takeoff weight entry and/or in V1 / VR speeds assessment	179
					151
					151 217
				Pilot tiredness - Inadequate workload distribution	167
					168
				,	198
				Lack of adherence to SOP for take-off procedure in terms of checking take-off	136
				configuration before application of take-off power.	201
\Box				Incorrect stab-trim setting	258
					259
				speed rejected take-off	46
				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	Г
					151
					167 168
				Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP	100
				decision	207
1.0	Danier and franchismiss and add	T005053	Brakes are not giving maximum braking, e.g. because of improper	Contract for the second	25
16	Brakes not functioning correctly	1005852	maintenance and damages		25 167
				Flaws in pilot requirements definition process and/or training methodology	168
				Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing	Г
					366
					151
				Unintuitive and / or error prone system manual - FMC	217
				Pilot tiredness - Inadequate workload distribution	167
					168
				configuration.	198
				Lack of adherence to SOP for take-off procedure in terms of checking take-off	Г
					201 258
				ů .	259
				Cautions / warnings (genuine or spurious) that may lead to a low-speed or high-	
				speed rejected take-off	46
					151
				Pilot tiredness - Inadequate workload distribution	167
				Flaws in pilot requirements definition process and/or training methodology	168
					207
			Failure of the flight crew to apply all the braking systems	accision.	207
17	Brakes not applied correctly	TO05B53	immediately after take-off rejection.	Pilot tiredness - Inadequate workload distribution	167
				Flaws in pilot requirements definition process and/or training methodology	168
-					199
				or / and passive contribution to the PF duties	151
				Unintuitive and / or error prone system manual - FMC	217
				Pilot tiredness - Inadequate workload distribution	167
					168
				configuration.	198
				Lack of adherence to SOP for take-off procedure in terms of checking take-off	
					201 258
				Undetected incorrect takeoff configuration	259
				Cautions / warnings (genuine or spurious) that may lead to a low-speed or high-	
				speed rejected take-off	46
					151
				Pilot tiredness - Inadequate workload distribution	167
				Flaws in pilot requirements definition process and/or training methodology	168
				Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP	307
				uecision	207
	Aircraft stalls after rotation Stall Unavoidable	TO05B61	No input to controls will allow the flight crew to avoid the stall	Aircraft stalls after rotation not identifiable at that level	
		16 Brakes not functioning correctly 17 Brakes not applied correctly		16 Brakes not functioning correctly TO05B52 maintenance and damages	Files on patie requirements definition process and by transpersable (1) All information, since the processing of the pro



		Base events	Code	Definition	Identifiable precursors	No.
					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	
2					or / and passive contribution to the PF duties	151
3					Unintuitive and / or error prone system manual - FMC	217
4	_				Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168
3					Lack of adherence to SOP for take-off procedure in terms of determining of aircraft	100
6					configuration.	198
-					Lack of adherence to SOP for take-off procedure in terms of checking take-off	
7					configuration before application of take-off power.	201
8					Incorrect stab-trim setting	258
9					Undetected incorrect takeoff configuration	259
10					System failure affecting aircraft configuration, controllability and/or flying qualities	25
١١					System failure affecting the operation of primary instruments / displays or standby	١
11					instruments	26
12					Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
12					Maintenance technician / airworthiness specialist tiredness - Inadequate workload	143
13					distribution	150
П					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	
14					or / and passive contribution to the PF duties	151
15					Pilot tiredness - Inadequate workload distribution	167
16					Flaws in pilot requirements definition process and/or training methodology	168
17					Incorrect use of automation - TOCW System	192
18					Flaws in aircraft system maintenance process definition - TOCW System	204
19					Unintuitive and / or error prone system manual - TOCW	219
20			1		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System	229
20					Inadequate certification process and / or flaws in methodology concerning verification	
					of the system / product compliance with requirements - Power supply system	
21			1		components	230
22					Flaws in manufacturer quality control process - Power supply system components	238
23					Flaws in aircraft system maintenance process definition - Electrical wiring System	252
Т					Lack of adherence to SOP in terms of awareness on supporting systems warning -	
1	19	Pilot ignores stickshaker	TO05B622	Flight crew take no action to the activated stick-shaker	stickshaker	197
2					Pilot tiredness - Inadequate workload distribution	167
3					Flaws in pilot requirements definition process and/or training methodology	168
					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	454
5					or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC	151 217
6	_				Pilot tiredness - Inadequate workload distribution	167
7	_				Flaws in pilot requirements definition process and/or training methodology	168
H					Lack of adherence to SOP for take-off procedure in terms of determining of aircraft	100
8					configuration.	198
Ħ					Lack of adherence to SOP for take-off procedure in terms of checking take-off	
9					configuration before application of take-off power.	201
10					Incorrect stab-trim setting	258
11					Undetected incorrect takeoff configuration	259
12					System failure affecting aircraft configuration, controllability and/or flying qualities	25
ا. ا					System failure affecting the operation of primary instruments / displays or standby	١
13					instruments	26
14					Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
14					Maintenance technician / airworthiness specialist tiredness - Inadequate workload	143
15					distribution	150
Ħ					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	
16					or / and passive contribution to the PF duties	151
17					Pilot tiredness - Inadequate workload distribution	167
18					Flaws in pilot requirements definition process and/or training methodology	168
19					Incorrect use of automation - TOCW System	192
20					Flaws in aircraft system maintenance process definition - TOCW System	204
21			-	 	Unintuitive and / or error prone system manual - TOCW	219
22					Inadequate certification process and / or flaws in methodology concerning verification	220
22					Inadequate certification process and / or flaws in methodology concerning verification	229
					of the system / product compliance with requirements - Power supply system	
23					components	230
24					Flaws in manufacturer quality control process - Power supply system components	238
25					Flaws in aircraft system maintenance process definition - Electrical wiring System	252
Т					System failure affecting the operation of primary instruments / displays or standby	
1	20	Stick shaker failure	TO05B6211	Stick-shaker fails due to improper manufacture or maintenance	instruments	26
2					Flaws in aircraft system maintenance process definition - stickshaker	136
					Flaws in maintenance technician / airworthiness specialist requirements definition	140
3					process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	149
4					distribution	150
H					Inadequate certification process and / or flaws in methodology concerning verification	
					of the system / product compliance with requirements - stickshaker system	
5					components	161
6					Flaws in manufacturer quality control process - Stickshaker system components	266
ΙŢ					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	Ι
7					or / and passive contribution to the PF duties	151
8					Unintuitive and / or error prone system manual - FMC	217
9 10					Pilot tiredness - Inadequate workload distribution	167
					Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft	168
10					configuration.	198
				+	Lack of adherence to SOP for take-off procedure in terms of checking take-off	198
11						
11						201
П					configuration before application of take-off power. Incorrect stab-trim setting	201 258
11					configuration before application of take-off power.	



		Base events	Code	Definition	Identifiable precursors	No.
4.5					System failure affecting the operation of primary instruments / displays or standby	
16			+		instruments Flaws in maintenance technician / airworthiness specialist requirements definition	26
17					process and/or training methodology	149
18					Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
10					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	150
19					or / and passive contribution to the PF duties	151
20 21					Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168
22					Incorrect use of automation - TOCW System	192
23					Flaws in aircraft system maintenance process definition - TOCW System	204
24					Unintuitive and / or error prone system manual - TOCW Inadequate certification process and / or flaws in methodology concerning verification	219
25					of the system / product compliance with requirements - TOCW System	229
П					Inadequate certification process and / or flaws in methodology concerning verification	
26					of the system / product compliance with requirements - Power supply system	220
26 27					components Flaws in manufacturer quality control process - Power supply system components	230 238
28					Flaws in aircraft system maintenance process definition - Electrical wiring System	252
	24	5: II 404 I	T00505040	Stall occurs at an AOA that is less than the AOA required to activate		40
2	21	Stall AOA too low	TO05B6212	the stick-shaker	Contaminated wing Extreme icing conditions encounter	12 20
H					System failure affecting the operation of primary instruments / displays or standby	
3					instruments	26
4 5					Inadequate aircraft de-icing / anti-icing Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing	180 208
6					Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.	210
7					Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT)	212
					Inadequate cortification process and / or flavor in most - d-leaves - d-leave	
8					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - antiice fluid HOT	213
9					Applied de-icing / anti-icing method is not sufficient for predicted conditions	228
10					Lack of adherence to SOP in terms of aircraft icing monitoring	231
11					Lack of adherence to SOP in terms of de-icing / anti-icing procedures. Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	232
12					or / and passive contribution to the PF duties	151
13					Unintuitive and / or error prone system manual - FMC	217
14 15					Pilot tiredness - Inadequate workload distribution	167
15					Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft	168
16					configuration.	198
П					Lack of adherence to SOP for take-off procedure in terms of checking take-off	
17 18					configuration before application of take-off power. Incorrect stab-trim setting	201 258
19					Undetected incorrect takeoff configuration	259
20					System failure affecting aircraft configuration, controllability and/or flying qualities	25
24					System failure affecting the operation of primary instruments / displays or standby	20
21					instruments Flaws in maintenance technician / airworthiness specialist requirements definition	26
22					process and/or training methodology	149
П					Maintenance technician / airworthiness specialist tiredness - Inadequate workload	
23					distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	150
24					or / and passive contribution to the PF duties	151
25					Pilot tiredness - Inadequate workload distribution	167
26 27					Flaws in pilot requirements definition process and/or training methodology Incorrect use of automation - TOCW System	168 192
28					Flaws in aircraft system maintenance process definition - TOCW System	204
29					Unintuitive and / or error prone system manual - TOCW	219
					Inadequate certification process and / or flaws in methodology concerning verification	
30					of the system / product compliance with requirements - TOCW System Inadequate certification process and / or flaws in methodology concerning verification	229
					of the system / product compliance with requirements - Power supply system	
31					components	230
32 33					Flaws in manufacturer quality control process - Power supply system components Flaws in aircraft system maintenance process definition - Electrical wiring System	238 252
33					rraws in ancialt system maintenance process definition - Electrical wiring System	252
VI+						
1+11	,	Flinks and fail				
+V \	/1	Flight crew fails to regain control		No input to controls will allow the flight crew to maintain control of	Flight crew fails to regain control	Н
1	22	Uncontrollable	TO05B71	the aircraft.	not identifiable at that level	
П					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	
2					or / and passive contribution to the PF duties	151 217
3 4					Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution	167
5					Flaws in pilot requirements definition process and/or training methodology	168
_					Lack of adherence to SOP for take-off procedure in terms of determining of aircraft	100
П						198
6					configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off	
П					configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201
6 7 8					Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting	258
6 7 8 9					Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration	258 259
6 7 8					Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting	258
6 7 8 9					Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby instruments	258 259
6 7 8 9 10					Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby instruments Flaws in maintenance technician / airworthiness specialist requirements definition	258 259 25 26
6 7 8 9					Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby instruments	258 259 25



14	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology 1 Incorrect use of automation - TOCW System 1 Flaws in aircraft system maintenance process definition - TOCW System 2	151
15	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology 1 Incorrect use of automation - TOCW System 1 Flaws in aircraft system maintenance process definition - TOCW System 2	151
16	Flaws in pilot requirements definition process and/or training methodology Incorrect use of automation - TOCW System Flaws in aircraft system maintenance process definition - TOCW System 2	167
17	Incorrect use of automation - TOCW System 1 Flaws in aircraft system maintenance process definition - TOCW System 2	168
18	Flaws in aircraft system maintenance process definition - TOCW System 2	192
	Unintuitive and / or error prone system manual - TOCW 2	204
		219
	Inadequate certification process and / or flaws in methodology concerning verification	
		229
22	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system	
		230
		238
		252
Mathematical Control Mathematical Control		12
		20
	System failure affecting the operation of primary instruments / displays or standby instruments	26
28		136
29	Flaws in maintenance technician / airworthiness specialist requirements definition	130
30		149
30	Maintenance technician / airworthiness specialist tiredness - Inadequate workload	
1		150
1	Inadequate certification process and / or flaws in methodology concerning verification	
1	of the system / product compliance with requirements - stickshaker system components 1	161
32		167
33		168
35		180
S	Lack of adherence to SOP in terms of awareness on supporting systems warning -	
1		197
37		208
Section Sect	" , "	210 212
39	Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT) 2	412
39	Inadequate certification process and / or flaws in methodology concerning verification	
40		213
1	Applied de-icing / anti-icing method is not sufficient for predicted conditions 2	228
1 23 Lack of control TOOSB72 The pilot makes no attempt to control the aircraft. 2		231
		232
3	·	167 168
		292
6	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	232
6		151
The state of the		217
8 8 8 8 8 9	Pilot tiredness - Inadequate workload distribution 1	167
10		168
9	Lack of adherence to SOP for take-off procedure in terms of determining of aircraft	
10	configuration. 1 Lack of adherence to SOP for take-off procedure in terms of checking take-off	198
11 12 13 14 15<		201
12		258
13		259
14		25
14	System failure affecting the operation of primary instruments / displays or standby	
15	instruments Flaws in maintenance technician / airworthiness specialist requirements definition	26
15		149
16	Maintenance technician / airworthiness specialist tiredness - Inadequate workload	
17		150
17	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	
18		151
19		167
20 21 22 23 24 25 26 27 28		168 192
21		204
22 23 24 25 26 27 27 28 28		219
23 24 25 26 27 27 28	Inadequate certification process and / or flaws in methodology concerning verification	
24	of the system / product compliance with requirements - TOCW System 2	229
24	Inadequate certification process and / or flaws in methodology concerning verification	
24	of the system / product compliance with requirements - Power supply system	220
25 26 27 28 28 28 29 29 29 29 29 29 29 29 29 29 29 29 29		230 238
26 27 28		252
27 28 28		12
		20
	System failure affecting the operation of primary instruments / displays or standby	
791 1		26
		136
30	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology 1	149
**	Maintenance technician / airworthiness specialist tiredness - Inadequate workload	143
31		150
	Inadequate certification process and / or flaws in methodology concerning verification	
	of the system / product compliance with requirements - stickshaker system	
32		161
33		167
35		168
. 33	Lack of adherence to SOP in terms of awareness on supporting systems warning -	180
36		197



		Base events	Code	Definition	Identifiable precursors	No.
37		pase events			Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing	208
38					Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.	210
39					Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT)	212
					Inadequate certification process and / or flaws in methodology concerning verification	
40					of the system / product compliance with requirements - antiice fluid HOT	213
41					Applied de-icing / anti-icing method is not sufficient for predicted conditions	228
42					Lack of adherence to SOP in terms of aircraft icing monitoring	231
43					Lack of adherence to SOP in terms of de-icing / anti-icing procedures.	232
		_		The pilot applies incorrect control to the aircraft. This can be due to		
1	24	Incorrect Control	TO05B73	improper training, stress and fatigue	Flaws in pilot requirements definition process and/or training methodology	168
2					Pilot tiredness - Inadequate workload distribution	167
3					Lack of adherence to AFM in terms of emergency procedures - stall recovery	292
4					Inadequate stall recovery procedure for the aircraft	152
اءا					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	454
6					or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC	151 217
7					Pilot tiredness - Inadequate workload distribution	167
8			+		Flaws in pilot requirements definition process and/or training methodology	168
٩					Lack of adherence to SOP for take-off procedure in terms of determining of aircraft	100
q					configuration.	198
9					Lack of adherence to SOP for take-off procedure in terms of checking take-off	196
10					configuration before application of take-off power.	201
11					Incorrect stab-trim setting	258
12					Undetected incorrect takeoff configuration	259
13			+		System failure affecting aircraft configuration, controllability and/or flying qualities	259
13					System failure affecting the operation of primary instruments / displays or standby	- 23
14			1		instruments	26
-7			+		Flaws in maintenance technician / airworthiness specialist requirements definition	
15			1		process and/or training methodology	149
			+		Maintenance technician / airworthiness specialist tiredness - Inadequate workload	243
16			1		distribution	150
			 		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	230
17			1		or / and passive contribution to the PF duties	151
18			+		Pilot tiredness - Inadequate workload distribution	167
19			1		Flaws in pilot requirements definition process and/or training methodology	168
20			1		Incorrect use of automation - TOCW System	192
21			1		Flaws in aircraft system maintenance process definition - TOCW System	204
22					Unintuitive and / or error prone system manual - TOCW	219
			1		Inadequate certification process and / or flaws in methodology concerning verification	
23					of the system / product compliance with requirements - TOCW System	229
			1		Inadequate certification process and / or flaws in methodology concerning verification	
					of the system / product compliance with requirements - Power supply system	
24					components	230
25					Flaws in manufacturer quality control process - Power supply system components	238
26			1		Flaws in aircraft system maintenance process definition - Electrical wiring System	252
27			1		Contaminated wing	12
28					Extreme icing conditions encounter	20
Ħ					System failure affecting the operation of primary instruments / displays or standby	
29					instruments	26
30					Flaws in aircraft system maintenance process definition - stickshaker	136
H					Flaws in maintenance technician / airworthiness specialist requirements definition	
31					process and/or training methodology	149
					Maintenance technician / airworthiness specialist tiredness - Inadequate workload	
32					distribution	150
\Box					Inadequate certification process and / or flaws in methodology concerning verification	
					of the system / product compliance with requirements - stickshaker system	
33					components	161
34					Pilot tiredness - Inadequate workload distribution	167
35					Flaws in pilot requirements definition process and/or training methodology	168
36					Inadequate aircraft de-icing / anti-icing	180
					Lack of adherence to SOP in terms of awareness on supporting systems warning -	
37			<u> </u>		stickshaker	197
38					Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing	208
39					Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.	210
40					Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT)	212
П						
			1		Inadequate certification process and / or flaws in methodology concerning verification	
41					of the system / product compliance with requirements - antiice fluid HOT	213
42					Applied de-icing / anti-icing method is not sufficient for predicted conditions	228
43					Lack of adherence to SOP in terms of aircraft icing monitoring	231
44					Lack of adherence to SOP in terms of de-icing / anti-icing procedures.	232
			1	The pilot applies correct measures but are not enough to prevent		
	25	Insufficient control	TO05B74	aircraft leaving off the side of the runway	Flaws in pilot requirements definition process and/or training methodology	168
1			1		Pilot tiredness - Inadequate workload distribution	167
2						
1 2 3					Lack of adherence to AFM in terms of emergency procedures - stall recovery	292
-					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	
3					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
3 4 5					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC	151 217
3 4 5 6					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution	151 217 167
3 4 5					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	151 217
3 4 5 6 7					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft	151 217 167 168
3 4 5 6					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.	151 217 167
3 4 5 6 7					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off	151 217 167 168 198
3 4 5 6 7 8					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	151 217 167 168 198
3 4 5 6 7 8 9					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting	151 217 167 168 198 201 258
3 4 5 6 7 8 9 10					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration	151 217 167 168 198 201 258 259
3 4 5 6 7 8 9					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration System failure affecting aircraft configuration, controllability and/or flying qualities	151 217 167 168 198 201 258
3 4 5 6 7 8 9 10 11					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration	151 217 167 168 198 201 258 259 25
3 4 5 6 7 8 9 10					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect take-off configuration System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby instruments /	151 217 167 168 198 201 258 259
3 4 5 6 7 8 9 10 11					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect take-off configuration. System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby	151 217 167 168 198 201 258 259 25



	Base events	Code	Definition	Identifiable precursors	No.
45				Maintenance technician / airworthiness specialist tiredness - Inadequate workload	450
15				distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	150
16				or / and passive contribution to the PF duties	151
17				Pilot tiredness - Inadequate workload distribution	167
18 19				Flaws in pilot requirements definition process and/or training methodology Incorrect use of automation - TOCW System	168 192
20				Flaws in aircraft system maintenance process definition - TOCW System	204
21				Unintuitive and / or error prone system manual - TOCW	219
				Inadequate certification process and / or flaws in methodology concerning verification	
22				of the system / product compliance with requirements - TOCW System Inadequate certification process and / or flaws in methodology concerning verification	229
				of the system / product compliance with requirements - Power supply system	
23				components	230
24				Flaws in manufacturer quality control process - Power supply system components	238
25 26				Flaws in aircraft system maintenance process definition - Electrical wiring System Contaminated wing	252 12
27				Extreme icing conditions encounter	20
				System failure affecting the operation of primary instruments / displays or standby	
28				instruments	26
29				Flaws in aircraft system maintenance process definition - stickshaker Flaws in maintenance technician / airworthiness specialist requirements definition	136
30				process and/or training methodology	149
-				Maintenance technician / airworthiness specialist tiredness - Inadequate workload	
31				distribution	150
				Inadequate certification process and / or flaws in methodology concerning verification	
32				of the system / product compliance with requirements - stickshaker system components	161
33				Pilot tiredness - Inadequate workload distribution	167
34				Flaws in pilot requirements definition process and/or training methodology	168
35				Inadequate aircraft de-icing / anti-icing	180
36				Lack of adherence to SOP in terms of awareness on supporting systems warning - stickshaker	197
37				Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing	208
38				Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.	210
39				Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT)	212
				Inadequate certification process and / or flaws in methodology concerning verification	
40				of the system / product compliance with requirements - antiice fluid HOT	213
41				Applied de-icing / anti-icing method is not sufficient for predicted conditions	228
42				Lack of adherence to SOP in terms of aircraft icing monitoring	231
43	Single Engine Failure			Lack of adherence to SOP in terms of de-icing / anti-icing procedures.	232
-	Single Engine Failure		Manufacture failure of a part of the engine which creates an	Single Engine Failure Inadequate certification process and / or flaws in methodology concerning verification	
			undetectable defect or a defect that is detectable by the	of the system / product compliance with requirements - Engine systems and / or	
1	1 Unsuccessful Manufacturing	TO09B11	manufacturers testing but not by maintenance testing	components	454
2				Flaws in manufacturer quality control process - Engine systems and / or components	458
3					
				Flaws in aircraft system maintenance process definition - Engine systems and / or components	463
3			Maintenance on the engine is not conducted or conducted	Flaws in aircraft system maintenance process definition - Engine systems and / or components	463
3			incorrectly, an incorrect modification is made or the manufacturer's	components	463
	2112222	T0000142	incorrectly, an incorrect modification is made or the manufacturer's guidelines are inadequate such that the maintenance performed is	components Flaws in maintenance technician / airworthiness specialist requirements definition	
	2 Unsuccessful Maintenance	T009B12	incorrectly, an incorrect modification is made or the manufacturer's	components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	463 149
	2 Unsuccessful Maintenance	TO09B12	incorrectly, an incorrect modification is made or the manufacturer's guidelines are inadequate such that the maintenance performed is	components Flaws in maintenance technician / airworthiness specialist requirements definition	149
1	2 Unsuccessful Maintenance	TO09B12	incorrectly, an incorrect modification is made or the manufacturer's guidelines are inadequate such that the maintenance performed is	components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution inadequate certification process and / or flaws in methodology concerning verification	
1 2	2 Unsuccessful Maintenance	TO09B12	incorrectly, an incorrect modification is made or the manufacturer's guidelines are inadequate such that the maintenance performed is	components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or	149 150
1 2	2 Unsuccessful Maintenance	TO09B12	incorrectly, an incorrect modification is made or the manufacturer's guidelines are inadequate such that the maintenance performed is	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components	149 150 454
1 2	2 Unsuccessful Maintenance	T009B12	incorrectly, an incorrect modification is made or the manufacturer's guidelines are inadequate such that the maintenance performed is	components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or	149 150
1 2	2 Unsuccessful Maintenance	T009B12	incorrectly, an incorrect modification is made or the manufacturer's guidelines are inadequate such that the maintenance performed is	components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components	149 150 454
1 2		T009B12	incorrectly, an incorrect modification is made or the manufacturer's guidelines are inadequate such that the maintenance performed is incorrect Engine is both unsuccessfully manufactured and where	components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in aircraft system maintenance process definition - Engine systems and / or components	149 150 454 458
1 2 3 4	Unsuccessful Manufacture and		incorrectly, an incorrect modification is made or the manufacturer's guidelines are inadequate such that the maintenance performed is incorrect Engine is both unsuccessfully manufactured and where maintenance fails to detect the defect that arise from	components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in aircraft system maintenance process definition - Engine systems and / or components Flaws in maintenance technician / airworthiness specialist requirements definition	149 150 454 458 463
1 2 3 4		T009B12	incorrectly, an incorrect modification is made or the manufacturer's guidelines are inadequate such that the maintenance performed is incorrect Engine is both unsuccessfully manufactured and where	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in aircraft system maintenance process definition - Engine systems and / or components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149 150 454 458
1 2 3 4	Unsuccessful Manufacture and		incorrectly, an incorrect modification is made or the manufacturer's guidelines are inadequate such that the maintenance performed is incorrect Engine is both unsuccessfully manufactured and where maintenance fails to detect the defect that arise from	components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in aircraft system maintenance process definition - Engine systems and / or components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	149 150 454 458 463 149
1 2 3 4	Unsuccessful Manufacture and		incorrectly, an incorrect modification is made or the manufacturer's guidelines are inadequate such that the maintenance performed is incorrect Engine is both unsuccessfully manufactured and where maintenance fails to detect the defect that arise from	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components in aircraft system maintenance process definition - Engine systems and / or components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification	149 150 454 458 463 149
1 2 3 4	Unsuccessful Manufacture and		incorrectly, an incorrect modification is made or the manufacturer's guidelines are inadequate such that the maintenance performed is incorrect Engine is both unsuccessfully manufactured and where maintenance fails to detect the defect that arise from	components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in aircraft system maintenance process definition - Engine systems and / or components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or	149 150 454 458 463 149
1 2 3 4	Unsuccessful Manufacture and		incorrectly, an incorrect modification is made or the manufacturer's guidelines are inadequate such that the maintenance performed is incorrect Engine is both unsuccessfully manufactured and where maintenance fails to detect the defect that arise from	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components in aircraft system maintenance process definition - Engine systems and / or components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification	149 150 454 458 463 149
1 2 3 4 5	Unsuccessful Manufacture and		incorrectly, an incorrect modification is made or the manufacturer's guidelines are inadequate such that the maintenance performed is incorrect Engine is both unsuccessfully manufactured and where maintenance fails to detect the defect that arise from	components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in aircraft system maintenance process definition - Engine systems and / or components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components	149 150 454 458 463 149 150 454 458
1 2 3 4 5	Unsuccessful Manufacture and		incorrectly, an incorrect modification is made or the manufacturer's guidelines are inadequate such that the maintenance performed is incorrect Engine is both unsuccessfully manufactured and where maintenance fails to detect the defect that arise from manufacturing	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in aircraft system maintenance process definition - Engine systems and / or components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components	149 150 454 458 463 149 150
1 2 3 4 5 5 1 2 2 3 4 4 5 5	Unsuccessful Manufacture and 3 Maintenance	T009B13	incorrectly, an incorrect modification is made or the manufacturer's guidelines are inadequate such that the maintenance performed is incorrect Engine is both unsuccessfully manufactured and where maintenance fails to detect the defect that arise from manufacturing Engine ingests objects such as debris left on the runway by other	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in aircraft system maintenance process definition - Engine systems and / or components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in aircraft system maintenance process definition - Engine systems and / or components	149 150 454 458 463 149 150 454 458
1 2 3 4 5 5 1 2 2 3 4 4 5 5	Unsuccessful Manufacture and		incorrectly, an incorrect modification is made or the manufacturer's guidelines are inadequate such that the maintenance performed is incorrect Engine is both unsuccessfully manufactured and where maintenance fails to detect the defect that arise from manufacturing	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in aircraft system maintenance process definition - Engine systems and / or components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in aircraft system maintenance process definition - Engine systems and / or	149 150 454 458 463 149 150 454 458 463 5
1 2 3 4 5 5 1 1 2 5 1 1	Unsuccessful Manufacture and 3 Maintenance	T009B13	incorrectly, an incorrect modification is made or the manufacturer's guidelines are inadequate such that the maintenance performed is incorrect Engine is both unsuccessfully manufactured and where maintenance fails to detect the defect that arise from manufacturing Engine ingests objects such as debris left on the runway by other	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in aircraft system maintenance process definition - Engine systems and / or components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in aircraft system maintenance process definition - Engine systems and / or components Flaws in aircraft system maintenance process definition - Engine systems and / or components Wildlife incursion	149 150 454 458 463 149 150 454 458 463 5 34 39
1 2 3 4 5 1 2 2 3 4 4 5 5 1 1 2 2	Unsuccessful Manufacture and 3 Maintenance	T009B13	incorrectly, an incorrect modification is made or the manufacturer's guidelines are inadequate such that the maintenance performed is incorrect Engine is both unsuccessfully manufactured and where maintenance fails to detect the defect that arise from manufacturing Engine ingests objects such as debris left on the runway by other	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in aircraft system maintenance process definition - Engine systems and / or components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in aircraft system maintenance process definition - Engine systems and / or components Wildlife incursion Bird strike Contaminated Runway Tire burst	149 150 454 458 463 149 150 454 458 463 5 34
1 2 3 4 5 5 1 1 2 2 3 4 4 5 5 1 1 2 2 3 4 4	Unsuccessful Manufacture and 3 Maintenance	T009B13	incorrectly, an incorrect modification is made or the manufacturer's guidelines are inadequate such that the maintenance performed is incorrect Engine is both unsuccessfully manufactured and where maintenance fails to detect the defect that arise from manufacturing Engine ingests objects such as debris left on the runway by other	components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in aircraft system maintenance process definition - Engine systems and / or components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Wildlife incursion Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition	149 150 454 458 463 149 150 454 458 463 5 34 39 80
1 2 3 4 5 5 1 2 2 3 3 4	Unsuccessful Manufacture and 3 Maintenance	T009B13	incorrectly, an incorrect modification is made or the manufacturer's guidelines are inadequate such that the maintenance performed is incorrect Engine is both unsuccessfully manufactured and where maintenance fails to detect the defect that arise from manufacturing Engine ingests objects such as debris left on the runway by other	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tredness - Inadequate workload distribution inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in incraft system maintenance process definition - Engine systems and / or components Wildlife incursion Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149 150 454 458 463 149 150 454 458 463 5 34 39
1 2 3 4 5 5 1 1 2 2 3 4 4 5 5 1 1 2 2 3 4 4	Unsuccessful Manufacture and 3 Maintenance	T009B13	incorrectly, an incorrect modification is made or the manufacturer's guidelines are inadequate such that the maintenance performed is incorrect Engine is both unsuccessfully manufactured and where maintenance fails to detect the defect that arise from manufacturing Engine ingests objects such as debris left on the runway by other	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Wildlife incursion Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tredness - Inadequate workload distribution	149 150 454 458 463 149 150 454 458 463 5 34 39 80
1 2 3 4 5 1 2 2 3 4 4 5 5 6 6	Unsuccessful Manufacture and 3 Maintenance	T009B13	incorrectly, an incorrect modification is made or the manufacturer's guidelines are inadequate such that the maintenance performed is incorrect Engine is both unsuccessfully manufactured and where maintenance fails to detect the defect that arise from manufacturing Engine ingests objects such as debris left on the runway by other	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tredness - Inadequate workload distribution inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Wildlife incursion Bird strike Contaminated Runway Tire burst Flaws in manintenance technician / airworthiness specialist tredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction	149 150 454 458 463 149 150 454 458 463 5 34 463 149 150
1 2 3 4 5 5 1 1 2 2 3 4 4 5 5 1 1 2 2 3 4 4	Unsuccessful Manufacture and 3 Maintenance	T009B13	incorrectly, an incorrect modification is made or the manufacturer's guidelines are inadequate such that the maintenance performed is incorrect Engine is both unsuccessfully manufactured and where maintenance fails to detect the defect that arise from manufacturing Engine ingests objects such as debris left on the runway by other	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in aircraft system maintenance process definition - Engine systems and / or components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in aircraft system maintenance process definition - Engine systems and / or components Wildlife incursion Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist bird hazard reduction procedure	149 150 454 458 463 149 150 454 458 463 5 34 39 80 149
1 2 3 4 5 1 2 2 3 4 4 5 5 6 6	Unsuccessful Manufacture and 3 Maintenance	T009B13	incorrectly, an incorrect modification is made or the manufacturer's guidelines are inadequate such that the maintenance performed is incorrect Engine is both unsuccessfully manufactured and where maintenance fails to detect the defect that arise from manufacturing Engine ingests objects such as debris left on the runway by other	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tredness - Inadequate workload distribution inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Wildlife incursion Bird strike Contaminated Runway Tire burst Flaws in manintenance technician / airworthiness specialist tredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction	149 150 454 458 463 149 150 454 458 463 5 34 463 149 150
1 2 3 4 5 1 2 2 3 4 4 5 5 6 6	Unsuccessful Manufacture and 3 Maintenance	T009B13	incorrectly, an incorrect modification is made or the manufacturer's guidelines are inadequate such that the maintenance performed is incorrect Engine is both unsuccessfully manufactured and where maintenance fails to detect the defect that arise from manufacturing Engine ingests objects such as debris left on the runway by other	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in maintenance quality control process - Engine systems and / or components Flaws in aircraft system maintenance process definition - Engine systems and / or components Flaws in aircraft system maintenance process definition - Engine systems and / or components Flaws in aircraft system maintenance process definition - Engine systems and / or components Flaws in aircraft system maintenance process definition - Engine systems and / or components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.	149 150 454 458 463 149 150 454 458 463 5 34 39 80 149 150 162
1 2 3 4 5 1 2 2 3 4 4 5 5 6 6	Unsuccessful Manufacture and 3 Maintenance	T009B13	incorrectly, an incorrect modification is made or the manufacturer's guidelines are inadequate such that the maintenance performed is incorrect Engine is both unsuccessfully manufactured and where maintenance fails to detect the defect that arise from manufacturing Engine ingests objects such as debris left on the runway by other	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Wildlife incursion Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence	149 150 454 458 463 149 150 454 458 463 5 34 39 80 149 150 162
1 2 3 4 4 5 5 1 2 2 3 3 4 4 5 5 6 6 7 7 8 8 9 9	Unsuccessful Manufacture and 3 Maintenance	T009B13	incorrectly, an incorrect modification is made or the manufacturer's guidelines are inadequate such that the maintenance performed is incorrect Engine is both unsuccessfully manufactured and where maintenance fails to detect the defect that arise from manufacturing Engine ingests objects such as debris left on the runway by other	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in aircraft system maintenance process definition - Engine systems and / or components Wildlife incursion Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.	149 150 454 458 463 149 150 454 458 463 5 34 39 80 149 150 162 216
1 2 3 4 5 1 2 2 3 4 4 5 5 6 6	Unsuccessful Manufacture and 3 Maintenance	T009B13	incorrectly, an incorrect modification is made or the manufacturer's guidelines are inadequate such that the maintenance performed is incorrect Engine is both unsuccessfully manufactured and where maintenance fails to detect the defect that arise from manufacturing Engine ingests objects such as debris left on the runway by other	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in inariart system maintenance process definition - Engine systems and / or components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in maintenance technician / airworthiness specialist requirements and / or components Wildlife incursion Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction proceedure Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	149 150 454 463 149 150 454 463 34 39 80 149 150 162 216



		Base events	Code	Definition	Identifiable precursors	No.
+		Flight crew rejects take-off			Flight crew rejects take-off	
171	"	riigiit crew rejects take-on		The pilot either misdiagnoses the situation or misunderstands the	riigiit crew rejects take-on	\vdash
				effects caused by a single engine failure, and hence incorrectly		
2	5	Pilot Misdiagnosis	TO09B211	aborts the take-off.	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168
3					Poor application of T/O & RTO procedure, failure recognition and preparedness	209
4					Wildlife incursion	5
5					Bird strike	34
7					Contaminated Runway Tire burst	39 80
					Flaws in maintenance technician / airworthiness specialist requirements definition	
8					process and/or training methodology	149
9					Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
9					Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction	130
10					procedure	162
					Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence	246
11					of contaminations.	216
					Inadequate certification process and / or flaws in methodology concerning verification	
12					of the system / product compliance with requirements - Landing gear components	358
13					Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence	401
13					integrity monitoring Inadequate certification process and / or flaws in methodology concerning verification	_
					of the system / product compliance with requirements - Engine systems and / or	
14					components	454
15					Flaws in manufacturer quality control process - Engine systems and / or components Flaws in aircraft system maintenance process definition - Engine systems and / or	458
16					components	463
17					Flaws in aircraft system maintenance process definition - Landing gear components.	377
18				The filebases of the second se	Flaws in manufacturer quality control process - Landing gear components.	376
1	6	Pilot Misjudgement	TO09B212	The flight crew diagnoses the engine failure but misjudges the situation and incorrectly aborts the take-off	Pilot tiredness - Inadequate workload distribution	167
2		Thor majaagement	10035212	station and meoriectly aborts the take on	Flaws in pilot requirements definition process and/or training methodology	168
					Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP	П
4					decision	207
5					Wildlife incursion Bird strike	5 34
6					Contaminated Runway	39
7					Tire burst	80
8					Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
0					Maintenance technician / airworthiness specialist tiredness - Inadequate workload	143
9					distribution	150
					Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction	
10					procedure Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence	162
11					of contaminations.	216
						П
12					Inadequate certification process and / or flaws in methodology concerning verification	
12					of the system / product compliance with requirements - Landing gear components Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence	358
13					integrity monitoring	401
					Inadequate certification process and / or flaws in methodology concerning verification	1
14					of the system / product compliance with requirements - Engine systems and / or components	454
15					Flaws in manufacturer quality control process - Engine systems and / or components	458
					Flaws in aircraft system maintenance process definition - Engine systems and / or	П
16 17					components	463
18					Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components.	377 376
				If the take-off is rejected when the aircraft is below V1 then this is a		
		Take-off rejected correctly when below		success, but it must be included to obtain the pivotal event		
2	7	V1	TO09B22	probability.	not identifiable at that level Wildlife incursion	5
3					Bird strike	34
4					Contaminated Runway	39
5					Tire burst	80
6					Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
0					Maintenance technician / airworthiness specialist tiredness - Inadequate workload	149
7					distribution	150
_					Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction	
8					procedure Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence	162
9					of contaminations.	216
10					Inadequate certification process and / or flaws in methodology concerning verification	
10					of the system / product compliance with requirements - Landing gear components Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence	358
11					integrity monitoring	401
					Inadequate certification process and / or flaws in methodology concerning verification	
12					of the system / product compliance with requirements - Engine systems and / or components	454
12					components Flaws in manufacturer quality control process - Engine systems and / or components	454 458
					Flaws in aircraft system maintenance process definition - Engine systems and / or	1.55
14					components	463
15					Flaws in aircraft system maintenance process definition - Landing gear components.	377
16	1				Flaws in manufacturer quality control process - Landing gear components.	376



		Base events	Code	Definition	Identifiable precursors	No.
III+		Flight crew fails to maintain control			Flisher was failed a serious in sector (Table off serious A)	
11+1	III	(Take-off rejected)		No input to controls will allow the pilot to maintain control of the	Flight crew fails to maintain control (Take-off rejected)	
1	8	Uncontrollable	TO09B31	aircraft after take-off rejection	not identifiable at the moment	
3					Wildlife incursion Bird strike	5 34
4					Contaminated Runway	39
5					Tire burst	80
٠					Flaws in maintenance technician / airworthiness specialist requirements definition	
6					process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	149
7					distribution	150
					Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction	
8					procedure Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence	162
9					of contaminations.	216
					Inadequate certification process and / or flaws in methodology concerning verification	
10					of the system / product compliance with requirements - Landing gear components	358
11					Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence	401
11					integrity monitoring Inadequate certification process and / or flaws in methodology concerning verification	_
					of the system / product compliance with requirements - Engine systems and / or	
12					components	454
13					Flaws in manufacturer quality control process - Engine systems and / or components Flaws in aircraft system maintenance process definition - Engine systems and / or	458
14					components	463
15					Flaws in aircraft system maintenance process definition - Landing gear components.	377
16 17					Flaws in manufacturer quality control process - Landing gear components.	376 167
18					Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	168
10					Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP	100
19					decision	207
20				The pilot makes no attempt to control the aircraft after take-off	Poor application of T/O & RTO procedure, failure recognition and preparedness	209
1	9	Lack of control	TO09B32	rejection	Pilot tiredness - Inadequate workload distribution	167
2					Flaws in pilot requirements definition process and/or training methodology	168
3					Poor application of T/O & RTO procedure, aircraft handling	388
4 5					Wildlife incursion Bird strike	5 34
6					Contaminated Runway	39
7					Tire burst	80
8					Flaws in maintenance technician / airworthiness specialist requirements definition	1.40
٥					process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	149
9					distribution	150
					Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction	
10					procedure Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence	162
11					of contaminations.	216
12					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
12					Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence	330
13					integrity monitoring	401
					Inadequate certification process and / or flaws in methodology concerning verification	1
14					of the system / product compliance with requirements - Engine systems and / or components	454
15					Flaws in manufacturer quality control process - Engine systems and / or components	458
					Flaws in aircraft system maintenance process definition - Engine systems and / or	
16 17			1		components Flaws in aircraft system maintenance process definition - Landing gear components.	463 377
18					Flaws in manufacturer quality control process - Landing gear components.	376
19					Pilot tiredness - Inadequate workload distribution	167
20					Flaws in pilot requirements definition process and/or training methodology	168
21					Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207
22					Poor application of T/O & RTO procedure, failure recognition and preparedness	209
				The pilot applies incorrect control to the aircraft after take-off		
1 2	10	Incorrect Control	TO09B33	rejection. This can be due to improper training, stress and fatigue	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168
3					Poor application of T/O & RTO procedure, aircraft handling	388
4					Wildlife incursion	5
5					Bird strike	34
6 7					Contaminated Runway Tire burst	39 80
_					Flaws in maintenance technician / airworthiness specialist requirements definition	55
8					process and/or training methodology	149
9					Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
У					Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction	120
10					procedure	162
					Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence	246
11					of contaminations.	216
					Inadequate certification process and / or flaws in methodology concerning verification	
			1	I and the second	of the system / product compliance with requirements - Landing gear components	358
12					Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence	-



		Base events	Code	Definition	Identifiable precursors	No.
					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or	
14					components	454
15					Flaws in manufacturer quality control process - Engine systems and / or components	458
16					Flaws in aircraft system maintenance process definition - Engine systems and / or components	463
17					Flaws in aircraft system maintenance process definition - Landing gear components.	377
18					Flaws in manufacturer quality control process - Landing gear components.	376
19					Pilot tiredness - Inadequate workload distribution	167
20					Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP	168
21					decision	207
22					Poor application of T/O & RTO procedure, failure recognition and preparedness	209
				The pilot applies correct measures after take-off rejection but are		
1	11	Insufficient control	TO09B34	not enough to prevent aircraft leaving off the side of the runway	Pilot tiredness - Inadequate workload distribution	167
2					Flaws in pilot requirements definition process and/or training methodology	168
3 4					Poor application of T/O & RTO procedure, aircraft handling Wildlife incursion	388 5
5					Bird strike	34
6					Contaminated Runway	39
7					Tire burst	80
					Flaws in maintenance technician / airworthiness specialist requirements definition	
8					process and/or training methodology	149
a					Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
9			 		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction	130
10					procedure	162
\sqcap			1		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence	П
11					of contaminations.	216
П						
12					Inadequate certification process and / or flaws in methodology concerning verification	250
12					of the system / product compliance with requirements - Landing gear components Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence	358
13					integrity monitoring	401
\sqcap			1		Inadequate certification process and / or flaws in methodology concerning verification	
					of the system / product compliance with requirements - Engine systems and / or	
14					components	454
15					Flaws in manufacturer quality control process - Engine systems and / or components Flaws in aircraft system maintenance process definition - Engine systems and / or	458
16					components	463
17					Flaws in aircraft system maintenance process definition - Landing gear components.	377
18					Flaws in manufacturer quality control process - Landing gear components.	376
19					Pilot tiredness - Inadequate workload distribution	167
20					Flaws in pilot requirements definition process and/or training methodology	168
24					Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP	1 1
21						207
22					decision	207
22						207 209
22 IV+					decision	
IV+ III+					decision Poor application of T/O & RTO procedure, failure recognition and preparedness	
IV+	V	Failure to achieve maximum braking			decision	
IV+ III+	v	Failure to achieve maximum braking		The runway is too short under wet or icy runway conditions for the	decision Poor application of T/O & RTO procedure, failure recognition and preparedness	
IV+ III+			TO09B41	The runway is too short under wet or icy runway conditions for the plane to come to a halt even if the take-off is aborted before V1 is reached.	decision Poor application of T/O & RTO procedure, failure recognition and preparedness	
IV+ III+ II+I I		Failure to achieve maximum braking Insufficient Runway Length	T009B41	plane to come to a halt even if the take-off is aborted before V1 is	decision Poor application of T/O & RTO procedure, failure recognition and preparedness Failure to achieve maximum braking	209
IV+ III+ II+I I			TO09B41	plane to come to a halt even if the take-off is aborted before V1 is	decision Poor application of T/O & RTO procedure, failure recognition and preparedness Failure to achieve maximum braking Convective weather - heavy rain resulted with wet RWY surface Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	75 167 168
V+ + + 1			TO09B41	plane to come to a halt even if the take-off is aborted before V1 is	decision Poor application of T/O & RTO procedure, failure recognition and preparedness Failure to achieve maximum braking Convective weather - heavy rain resulted with wet RWY surface Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Gross error in takeoff weight entry and/or in V1 / VR speeds assessment	75 167
V+ + + * 1 2 3			TO09B41	plane to come to a halt even if the take-off is aborted before V1 is	decision Poor application of T/O & RTO procedure, failure recognition and preparedness Failure to achieve maximum braking Convective weather - heavy rain resulted with wet RWY surface Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Gross error in takeoff weight entry and/or in V1 / VR speeds assessment Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of	75 167 168
V+ + + * 1 2 3			T009B41	plane to come to a halt even if the take-off is aborted before V1 is	decision Poor application of T/O & RTO procedure, failure recognition and preparedness Failure to achieve maximum braking Convective weather - heavy rain resulted with wet RWY surface Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Gross error in takeoff weight entry and/or in V1 / VR speeds assessment Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below	75 167 168 179
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IV+ III+ I			TO09B41	plane to come to a halt even if the take-off is aborted before V1 is	decision Poor application of T/O & RTO procedure, failure recognition and preparedness Failure to achieve maximum braking Convective weather - heavy rain resulted with wet RWY surface Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Gross error in takeoff weight entry and/or in V1 / VR speeds assessment Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum High energy RTO rate is an indicator of improper Operator's policy for T/O operations. Poor application of T/O & RTO procedure, computation of T/O parameters Wildlife incursion Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in manufacturer quality control process definition - Landing gear components. Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components.	209 75 167 168 179 203 211 260 5 34 39 149 150 162 216 358 401 454 458 463 377 376 167
IV+ III+ I III+ IIII+ III+ III+ III+ III+ III+ III+ III+ III+ III			TO09841	plane to come to a halt even if the take-off is aborted before V1 is	decision Poor application of T/O & RTO procedure, failure recognition and preparedness Failure to achieve maximum braking Convective weather - heavy rain resulted with wet RWY surface Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Gross error in takeoff weight entry and/or in V1 / VR speeds assessment Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum High energy RTO rate is an indicator of improper Operator's policy for T/O operations. Poor application of T/O & RTO procedure, computation of T/O parameters Wildlife incursion Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in aircraft system maintenance process - Engine systems and / or components Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in aircraft system maintenance process and/or training methodology	75 167 168 179 203 211 260 5 34 39 80 149 150 216 216 358 401 454 458 463 377 376
IV+ III+ I			T009B41	plane to come to a halt even if the take-off is aborted before V1 is	decision Poor application of T/O & RTO procedure, failure recognition and preparedness Failure to achieve maximum braking Convective weather - heavy rain resulted with wet RWY surface Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Gross error in takeoff weight entry and/or in V1 / VR speeds assessment Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum High energy RTO rate is an indicator of improper Operator's policy for T/O operations. Poor application of T/O & RTO procedure, computation of T/O parameters Wildlife incursion Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in manufacturer quality control process definition - Landing gear components. Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components.	209 75 167 168 179 203 211 260 5 34 39 149 150 162 216 358 401 454 458 463 377 376 167



		Base events	Code	Definition	Identifiable precursors	No.
26					Poor application of T/O & RTO procedure, failure recognition and preparedness	209
27					Pilot tiredness - Inadequate workload distribution	167
28					Flaws in pilot requirements definition process and/or training methodology	168
29					Poor application of T/O & RTO procedure, aircraft handling	388
5	13	Brakes not functioning correctly	TO09B42	Brakes are not giving maximum braking, i.e. because of improper maintenance and damages	System failure affecting aircraft configuration, controllability and/or flying qualities	25
6		brakes not ranctioning correctly	1003512	mantenance and damages	Contaminated Runway	39
П					Flaws in maintenance technician / airworthiness specialist requirements definition	
7					process and/or training methodology	149
					Maintenance technician / airworthiness specialist tiredness - Inadequate workload	
8					distribution	150
9					Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.	216
- 3					Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing	210
10					control related system and components (incl. brake).	366
11					Wildlife incursion	5
12					Bird strike	34
13					Contaminated Runway	39
14					Tire burst	80
15					Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
13					Maintenance technician / airworthiness specialist tiredness - Inadequate workload	143
16					distribution	150
П					Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction	
17					procedure COMP (COMP)	162
					Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence	3.5
18					of contaminations.	216
					Inadequate certification process and / or flaws in methodology concerning verification	
19					of the system / product compliance with requirements - Landing gear components	358
Ħ					Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence	
20					integrity monitoring	401
					Inadequate certification process and / or flaws in methodology concerning verification	П
					of the system / product compliance with requirements - Engine systems and / or	
21 22			 		components Flaws in manufacturer quality control process - Engine systems and / or components	454 458
22					Flaws in aircraft system maintenance process definition - Engine systems and / or	436
23					components	463
24					Flaws in aircraft system maintenance process definition - Landing gear components.	377
25					Flaws in manufacturer quality control process - Landing gear components.	376
26					Pilot tiredness - Inadequate workload distribution	167
27					Flaws in pilot requirements definition process and/or training methodology	168
20					Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP	207
28 29					decision Poor application of T/O & RTO procedure, failure recognition and preparedness	207
30					Pilot tiredness - Inadequate workload distribution	167
31					Flaws in pilot requirements definition process and/or training methodology	168
31 32					Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling	168 388
32				Failure of the flight crew to apply all the braking systems	Poor application of T/O & RTO procedure, aircraft handling	388
32 1	14	Brakes not applied correctly	TO09B43	Failure of the flight crew to apply all the braking systems immediately after take-off rejection.	Poor application of T/O & RTO procedure, aircraft handling Pilot tiredness - Inadequate workload distribution	388 167
32 1 2	14	Brakes not applied correctly	TO09B43		Poor application of T/O & RTO procedure, aircraft handling Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	388 167 168
32 1 2 3	14	Brakes not applied correctly	TO09B43		Poor application of T/O & RTO procedure, aircraft handling Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, braking initiation sequence	388 167 168 199
32 1 2	14	Brakes not applied correctly	TO09B43		Poor application of T/O & RTO procedure, aircraft handling Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	388 167 168
1 2 3 4	14	Brakes not applied correctly	T009B43		Poor application of T/O & RTO procedure, aircraft handling Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, braking initiation sequence Wildlife incursion	388 167 168 199 5
1 2 3 4 5	14	Brakes not applied correctly	TO09B43		Poor application of T/O & RTO procedure, aircraft handling Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, braking initiation sequence Wildlife incursion Bird strike Contaminated Runway Tire burst	388 167 168 199 5 34
32 3 4 5 6 7	14	Brakes not applied correctly	TO09B43		Poor application of T/O & RTO procedure, aircraft handling Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, braking initiation sequence Wildlife incursion Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition	167 168 199 5 34 39 80
32 1 2 3 4 5 6	14	Brakes not applied correctly	T009B43		Poor application of T/O & RTO procedure, aircraft handling Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, braking initiation sequence Wildlife incursion Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	388 167 168 199 5 34 39
32 3 4 5 6 7	14	Brakes not applied correctly	TO09B43		Poor application of T/O & RTO procedure, aircraft handling Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, braking initiation sequence Wildlife incursion Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition	167 168 199 5 34 39 80
32 3 4 5 6 7	14	Brakes not applied correctly	TO09B43		Poor application of T/O & RTO procedure, aircraft handling Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, braking initiation sequence Wildlife incursion Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	167 168 199 5 34 39 80
32 3 4 5 6 7	14	Brakes not applied correctly	TO09B43		Poor application of T/O & RTO procedure, aircraft handling Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, braking initiation sequence Wildlife incursion Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist irredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	167 168 199 5 34 39 80
1 2 3 4 5 6 7 8 9	14	Brakes not applied correctly	T009B43		Poor application of T/O & RTO procedure, aircraft handling Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, braking initiation sequence Wildlife incursion Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence	388 167 168 199 5 34 39 80 149 150
32 1 2 3 4 5 6 7 8	14	Brakes not applied correctly	T009B43		Poor application of T/O & RTO procedure, aircraft handling Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, braking initiation sequence Wildlife incursion Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist irredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	388 167 168 199 5 34 39 80 149
1 2 3 4 5 6 7 8 9	14	Brakes not applied correctly	TO09B43		Poor application of T/O & RTO procedure, aircraft handling Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, braking initiation sequence Wildlife incursion Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.	388 167 168 199 5 34 39 80 149 150 162 216
1 2 3 4 5 6 7 8 9	14	Brakes not applied correctly	TO09843		Poor application of T/O & RTO procedure, aircraft handling Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, braking initiation sequence Wildlife incursion Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Inadequate certification process and / or flaws in methodology concerning verification	388 167 168 199 5 34 39 80 149 150 162 216
1 2 3 4 5 6 7 8 9	14	Brakes not applied correctly	TO09B43		Poor application of T/O & RTO procedure, aircraft handling Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, braking initiation sequence Wildlife incursion Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.	388 167 168 199 5 34 39 80 149 150 162 216
1 2 3 4 5 6 7 8 9	14	Brakes not applied correctly	T009B43		Poor application of T/O & RTO procedure, aircraft handling Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, braking initiation sequence Wildlife incursion Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	388 167 168 199 5 34 39 80 149 150 162 216 358 401
32 1 2 3 4 5 6 7 8 9 10 11	14	Brakes not applied correctly	T009B43		Poor application of T/O & RTO procedure, aircraft handling Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, braking initiation sequence Wildlife incursion Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring Inadequate certification process and / or flaws in methodology concerning verification efficiently monitoring	388 167 168 199 5 34 39 80 149 150 162 216 358 401
32 1 2 3 4 5 6 7 8 9 10 11	14	Brakes not applied correctly	TO09B43		Poor application of T/O & RTO procedure, aircraft handling Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, braking initiation sequence Wildlife incursion Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or	388 167 168 199 5 34 39 80 149 150 162 216 358 401
32 1 2 3 4 5 6 7 8 9 10 11 12 13	14	Brakes not applied correctly	TO09B43		Poor application of T/O & RTO procedure, aircraft handling Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, braking initiation sequence Wildlife incursion Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components	388 167 168 199 5 34 39 80 149 150 162 216 358 401
32 1 2 3 4 5 6 7 8 9 10 11	14	Brakes not applied correctly	T009B43		Poor application of T/O & RTO procedure, aircraft handling Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, braking initiation sequence Wildlife incursion Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components	388 167 168 199 5 34 39 80 149 150 162 216 358 401
32 1 2 3 4 5 6 7 8 9 10 11 12 13	14	Brakes not applied correctly	T009B43		Poor application of T/O & RTO procedure, aircraft handling Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, braking initiation sequence Wildlife incursion Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components	388 167 168 199 5 34 39 80 149 150 162 216 358 401 454 458
32 1 2 3 4 5 6 7 8 9 10 11 12 13	14	Brakes not applied correctly	TO09B43		Poor application of T/O & RTO procedure, aircraft handling Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, braking initiation sequence Wildlife incursion Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in aircraft system maintenance process - Engine systems and / or components Flaws in aircraft system maintenance process definition - Engine systems and / or	388 167 168 199 5 34 39 80 149 150 162 216 358 401
32 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18	14	Brakes not applied correctly	TO09843		Poor application of T/O & RTO procedure, aircraft handling Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, braking initiation sequence Wildlife incursion Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction proceedure Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in aircraft system maintenance process definition - Landing gear components.	388 167 168 199 5 34 39 80 149 150 216 358 401 454 458 463 377 376
32 32 33 4 5 6 7 7 10 11 12 13 14 15 16 17 17 18 19	14	Brakes not applied correctly	TO09B43		Poor application of T/O & RTO procedure, aircraft handling Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, braking initiation sequence Wildlife incursion Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction proceedure Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in aircraft system maintenance process Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Pilot tiredness - Inadequate workload distribution	388 167 168 199 5 34 39 80 149 150 162 216 358 401 454 458 463 377 167
32 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18	14	Brakes not applied correctly	TO09B43		Poor application of T/O & RTO procedure, aircraft handling Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, braking initiation sequence Wildlife incursion Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in aircraft system maintenance process definition - Engine systems and / or components Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Flaws in manufacturer delition process and/or training methodology	388 167 168 199 5 34 39 80 149 150 216 358 401 454 458 463 377 376
32 1 2 3 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 20 20 20 20 20 20 20 20 20	14	Brakes not applied correctly	TO09B43		Poor application of T/O & RTO procedure, aircraft handling Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, braking initiation sequence Wildlife incursion Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction proceedure Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in in trequirements definition process - Landing gear components. Flaws in in trequirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP	388 167 168 199 5 34 39 80 149 150 216 358 401 454 458 463 377 376 167 168
32 1 2 3 3 4 5 6 7 7 8 8 9 10 11 12 13 14 15 16 17 18 19 20 20 21	14	Brakes not applied correctly	TO09843		Poor application of T/O & RTO procedure, aircraft handling Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, braking initiation sequence Wildlife incursion Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction proceedure Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Flaws in aircraft system maintenance process definition - Engine systems and / or components of manufacturer quality control process - Landing gear components.	388 167 168 199 5 34 39 80 149 150 216 358 401 454 458 463 377 167 168 207
32 1 2 3 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 21 22	14	Brakes not applied correctly	TO09B43		Poor application of T/O & RTO procedure, aircraft handling Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, braking initiation sequence Wildlife incursion Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction proceedure Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in in trequirements definition process - Landing gear components. Flaws in in trequirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP	388 167 168 199 5 34 39 80 149 150 216 358 401 454 458 463 377 376 167 168
32 1 2 3 3 4 5 6 7 7 8 8 9 10 11 12 13 14 15 16 17 18 19 20 20 21	14	Brakes not applied correctly	TO09B43		Poor application of T/O & RTO procedure, aircraft handling Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, braking initiation sequence Wildlife incursion Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in manufacturer quality control process - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Flaws in manufacturer duality control process - Landing gear components. Flaws in manufacturer duality control process - Landing gear components. Flaws in manufacturer duality control process - Landing gear components. Flaws in manufacturer duality control process - Landing gear components. Flaws in manufacturer duality control process - Landing gear components. Flaws in manufacturer duality control process - Landing gear components. Flaws in pilot requirements de	388 167 168 199 80 149 150 162 216 358 401 454 458 463 377 376 168 207 209
12 33 44 55 67 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 22 23	14		TO09B43		Poor application of T/O & RTO procedure, aircraft handling Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, braking initiation sequence Wildlife incursion Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction proceedure Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in inarcraft system maintenance process definition - Engine systems and / or components Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in inarcraft system maintenance process definition - Landing gear components. Flaws in inarcraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Flaws in inarcraft system maintenance process definition - Canding gear components. Flaws in inarcraft system maintenance process definition - Landing gear components. Flaws in inarcraft system maintenance process definition - Canding gear components. Flaws in inarcraft system maintenance process and/or training methodology Poor application of T/O & RTO procedure, failure recognition and preparedness Pilot tiredness - Inadequate wor	388 167 168 199 5 34 39 80 149 150 162 216 358 401 454 458 463 377 376 167 168 209 167
12 23 34 5 6 7 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25		Figiht crew fails to maintain control	TO09843		Poor application of T/O & RTO procedure, aircraft handling Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, braking initiation sequence Wildlife incursion Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in aircraft system maintenance process definition - Engine systems and / or components Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in aircraft system maintenance process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Poor application of T/O & RTO procedure, failure recognition and preparedness Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, ailure recognition and preparedness Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	388 167 168 199 39 149 150 162 216 358 401 454 458 463 377 168 207 209 167 168
32 1 2 3 4 5 6 7 7 8 8 9 10 11 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 27 28 29 20 20 20 20 20 20 20 20 20 20			TO09843	immediately after take-off rejection.	Poor application of T/O & RTO procedure, aircraft handling Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, braking initiation sequence Wildlife incursion Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction proceedure Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in marufacturer quality control process definition - Landing gear components. Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, failure recognition and preparedness Filot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	388 167 168 199 39 149 150 162 216 358 401 454 458 463 377 168 207 209 167 168
32 1 2 33 4 5 6 7 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 V+I	V	Figiht crew fails to maintain control (Take-off continued)		Immediately after take-off rejection.	Poor application of T/O & RTO procedure, aircraft handling Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, braking initiation sequence Wildlife incursion Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction process and/or training methodology Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in aircraft system maintenance process - Engine systems and / or components Flaws in in aircraft system maintenance process definition - Engine systems and / or components Flaws in in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Flaws in in aircraft system maintenance process definition - Landing gear components. Flaws in in aircraft system maintenance process definition - Landing gear components. Flaws in in constance in maintenance process and/or training methodology Poor application of T/O & RTO procedure, aflarer ecognition and preparedness Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, af	388 167 168 199 39 149 150 162 216 358 401 454 458 463 377 168 207 209 167 168
32 1 2 3 4 5 6 7 8 9 10 11 13 14 15 16 17 18 19 20 21 22 23 24 25 25 27 27 27 27 27 27 27 27 27 27	V	Figiht crew fails to maintain control	TO09851	immediately after take-off rejection.	Poor application of T/O & RTO procedure, aircraft handling Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, braking initiation sequence Wildlife incursion Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist triedness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in aircraft system maintenance process definition - Landing gear components Flaws in aircraft system maintenance process definition - Landing gear components Flaws in aircraft system maintenance process definition - Landing gear components Flaws in aircraft system maintenance process and/or training methodology Poor application of T/O & RTO procedure, failure recognition and preparedness Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling Flight crew fails to maintain control (Take-off continued) not identifiable at that level	388 167 168 199 80 149 150 162 216 358 401 454 458 463 377 376 167 168 207 209 167 168
32 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 V+I	V	Figiht crew fails to maintain control (Take-off continued)		Immediately after take-off rejection.	Poor application of T/O & RTO procedure, aircraft handling Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, braking initiation sequence Wildlife incursion Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction process and/or training methodology Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in aircraft system maintenance process - Engine systems and / or components Flaws in in aircraft system maintenance process definition - Engine systems and / or components Flaws in in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Flaws in in aircraft system maintenance process definition - Landing gear components. Flaws in in aircraft system maintenance process definition - Landing gear components. Flaws in in constance in maintenance process and/or training methodology Poor application of T/O & RTO procedure, aflarer ecognition and preparedness Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, af	388 167 168 199 39 149 150 162 216 358 401 454 458 463 377 168 207 209 167 168
11 12 33 44 56 77 88 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 25 25 27 27 27 27 27 27 27 27 27 27 27 27 27	V	Figiht crew fails to maintain control (Take-off continued)		Immediately after take-off rejection.	Poor application of T/O & RTO procedure, aircraft handling Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, braking initiation sequence Wildlife incursion Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist triedness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction proceedure Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in inacraft system maintenance process definition - Landing gear components. Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in inacreaft system maintenance process definition - Landing gear components. Pilot tiredness - Inadequate workload distribution Flaws in manufacturer quality control process - Landing gear components. Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, failure recognition and preparedness Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, afailure recognition and	388 167 168 199 39 80 149 150 162 216 358 401 454 458 463 377 168 207 209 209 167 168 388



		Base events	Code	Definition	Identifiable precursors	No.
5					Tire burst	80
П					Flaws in maintenance technician / airworthiness specialist requirements definition	
6					process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	149
7					distribution	150
П					Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction	
8					procedure	162
					Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.	216
9			+		or contaminations.	216
					Inadequate certification process and / or flaws in methodology concerning verification	
10					of the system / product compliance with requirements - Landing gear components	358
11					Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence	401
11					integrity monitoring Inadequate certification process and / or flaws in methodology concerning verification	401
					of the system / product compliance with requirements - Engine systems and / or	
12					components	454
13			-		Flaws in manufacturer quality control process - Engine systems and / or components Flaws in aircraft system maintenance process definition - Engine systems and / or	458
14					components	463
15					Flaws in aircraft system maintenance process definition - Landing gear components.	377
16					Flaws in manufacturer quality control process - Landing gear components.	376
1	16	Lack of control	TO09B52	The pilot makes no attempt to control the aircraft after take-off continuation	Dilat tiradness Inadequate workload distribution	167
2	10	Lack of control	1009632	Continuation	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	168
3					Lack of adherence to AFM in terms of emergency procedures - stall recovery	292
4					Wildlife incursion	5
5			 		Bird strike Contaminated Runway	34 39
7				 	Contaminated Runway Tire burst	39 80
H					Flaws in maintenance technician / airworthiness specialist requirements definition	30
8					process and/or training methodology	149
			_		Maintenance technician / airworthiness specialist tiredness - Inadequate workload	[]
9				+	distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction	150
10					procedure	162
П					Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence	
11					of contaminations.	216
					Inadequate certification process and / or flaws in methodology concerning verification	
12					of the system / product compliance with requirements - Landing gear components	358
П					Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence	
13					integrity monitoring	401
					Inadequate certification process and / or flaws in methodology concerning verification	
14					of the system / product compliance with requirements - Engine systems and / or components	454
15					Flaws in manufacturer quality control process - Engine systems and / or components	458
П					Flaws in aircraft system maintenance process definition - Engine systems and / or	
16 17			-		components	463
18					Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components.	377 376
Ħ				The pilot applies incorrect control to the aircraft after take-off	000000	
		_		continuation. This can be due to improper training, stress and		
2	17	Incorrect Control	TO09B53	fatigue	Pilot tiredness - Inadequate workload distribution	167 168
3			+		Flaws in pilot requirements definition process and/or training methodology Lack of adherence to AFM in terms of emergency procedures - stall recovery	292
4					Wildlife incursion	5
5					Bird strike	34
6			-		Contaminated Runway Tire burst	39 80
+			+		Flaws in maintenance technician / airworthiness specialist requirements definition	80
8					process and/or training methodology	149
					Maintenance technician / airworthiness specialist tiredness - Inadequate workload	
9			+	 	distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction	150
10		i .			reservor danierence to iemo minick 14 pmnrs, root of memicient bild indigital reduction	
\rightarrow					procedure	162
1					Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence	162
11						162 216
11					Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.	216
					Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence	216
11					Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Inadequate certification process and / or flaws in methodology concerning verification	216
					Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	216 358 401
12					Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring. Inadequate certification process and / or flaws in methodology concerning verification	216 358 401
12					Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	216 358 401
12					Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or	216 358 401
12 13 14 15					Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in aircraft system maintenance process definition - Engine systems and / or	216 358 401 454 458
12 13 14 15					Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in aircraft system maintenance process definition - Engine systems and / or components	216 358 401 454 458 463
12 13 14 15					Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components in aircraft system maintenance process definition - Engine systems and / or components Flaws in aircraft system maintenance process definition - Landing gear components.	216 358 401 454 458
12 13 14 15 16				The pilot applies correct measures after take-off continuation but	Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in aircraft system maintenance process definition - Engine systems and / or components	216 358 401 454 458 463 377
12 13 14 15 16				are not enough to prevent aircraft leaving off the side of the	Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in aircraft system maintenance process definition - Engine systems and / or components Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components.	216 358 401 454 458 463 377 376
12 13 14 15 16 17 18	18	Insufficient control	TO09854		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components in aircraft system maintenance process definition - Engine systems and / or components Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Flaws in manufacturer quality control process - Landing gear components.	358 401 454 458 463 377 376
12 13 14 15 16 17 18	18	Insufficient control	T009B54	are not enough to prevent aircraft leaving off the side of the	Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in aircraft system maintenance process definition - Engine systems and / or components Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components.	358 401 454 458 463 377 376 167 168
12 13 14 15 16 17 18	18	Insufficient control	TO09854	are not enough to prevent aircraft leaving off the side of the	Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components in aircraft system maintenance process definition - Engine systems and / or components Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Flaws in manufacturer quality control process - Landing gear components.	358 401 454 458 463 377 376
12 13 14 15 16 17 18 1 2 3 4	18	Insufficient control	TO09854	are not enough to prevent aircraft leaving off the side of the	Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components flaws in inarcraft system maintenance process definition - Engine systems and / or components Flaws in initraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to AFM in terms of emergency procedures - stall recovery Wildlife incursion Bird strike	216 358 401 454 458 463 377 376 167 168 292 5 34
12 13 14 15 16 17 18 1 2 3 4 5 6	18	Insufficient control	TO09B54	are not enough to prevent aircraft leaving off the side of the	Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in aircraft system maintenance process definition - Engine systems and / or components Flaws in aircraft system maintenance process definition - Landing gear components. Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to AFM in terms of emergency procedures - stall recovery Wildlife incursion Sird strike Contaminated Runway	216 358 401 454 458 463 377 376 167 168 292 5 34 39
12 13 14 15 16 17 18 1 2 3 4	18	Insufficient control	T009B54	are not enough to prevent aircraft leaving off the side of the	Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components flaws in inarcraft system maintenance process definition - Engine systems and / or components Flaws in initraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to AFM in terms of emergency procedures - stall recovery Wildlife incursion Bird strike	216 358 401 454 458 463 377 376 167 168 292 5 34



		Base events	Code	Definition	Identifiable precursors	No.
					Maintenance technician / airworthiness specialist tiredness - Inadequate workload	450
9					distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction	150
10					procedure	162
11					Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.	216
12					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
12					Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence	330
13					integrity monitoring	401
					Inadequate certification process and / or flaws in methodology concerning verification	
14					of the system / product compliance with requirements - Engine systems and / or components	454
15					Flaws in manufacturer quality control process - Engine systems and / or components	458
					Flaws in aircraft system maintenance process definition - Engine systems and / or	
16 17					components	463 377
18					Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components.	376
1		Pitch Control Problem			Pitch Control Problem	-
Т				Flight crew fail to complete the trim configuration checklist and fail		
2	1	Trim settings incorrectly determined	TO10B1111	to verify the checklist	Pilot tiredness - Inadequate workload distribution	167 168
-					Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft	108
3					configuration.	198
4					Incorrect stab-trim setting	258
1	,	Spood cottings incorrectly determined	TO10B1112	Flight crew fail to complete the speed bug checklist and fail to	Pilot tiredness - Inadequate workload distribution	167
2		Speed settings incorrectly determined	101001117	verify the checklist	Flaws in pilot requirements definition process and/or training methodology	168
Ť					Lack of adherence to SOP for take-off procedure in terms of speed bug checklist	
3					preparation and verification.	419
		Trim settings incorrectly entered into		Given that the trim settings have been correctly determined, the co	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	
1		Trim settings incorrectly entered into FMC	TO10B112	pilot enter the settings incorrectly and these are verified by the captain during the taxi checklist	or / and passive contribution to the PF duties	151
2					Pilot tiredness - Inadequate workload distribution	167
3					Flaws in pilot requirements definition process and/or training methodology	168
		Enough cottings incorrectly entered into		Given that the speed bugs have been correctly determined, flight	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	
1	4	Speed settings incorrectly entered into FMC	TO10B113	crew enter the settings incorrectly and these are verified by the captain during the taxi checklist	or / and passive contribution to the PF duties	151
2					Pilot tiredness - Inadequate workload distribution	167
3					Flaws in pilot requirements definition process and/or training methodology	168
				Flight grow applies inappropriate inputs to the flight controls	Lack of adherence to the COD in terms of DNE flight payameters / situation manifesing	
1	5	Unsuccessful Pitch Control Inputs	TO10B12	Flight crew applies inappropriate inputs to the flight controls causing pitch control problems and resulting in difficulty taking off.	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
2					Pilot tiredness - Inadequate workload distribution	167
3					Flaws in pilot requirements definition process and/or training methodology	168
4					Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201
5					Slow rotation (i.e., low pitch rate)	371
				Unsuccessful design of one of the integral components causes the	System failure affecting the operation of primary instruments / displays or standby	
1	6	Unsuccessful Design	TO10B1311	failure of a flight control system	instruments	26
					Inadequate certification process and / or flaws in methodology concerning verification	
2					of the system / product compliance with requirements - FCS system or components	420
T				Unsuccessful manufacture of one of the integral components	System failure affecting the operation of primary instruments / displays or standby	
1	7	Unsuccessful Manufacture	TO10B1312	causes the failure of a flight control system	instruments	26
2				Maintenance of the flight control system is not conducted or not	Flaws in manufacturer quality control process - FCS system components	421
				successfully completed such that one of the flight control system	System failure affecting the operation of primary instruments / displays or standby	
1	8	Unsuccessful Maintenance	TO10B1313	fails	instruments	26
2					Flaws in maintenance technician / airworthiness specialist requirements definition	1.40
-					process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	149
3					distribution	150
Т						
4				A foreign object strikes one of the control surfaces rendering it	Flaws in aircraft system maintenance process definition - FCS systems or components	422
1	9	Foreign Object Damage	TO10B1314	ineffective. Such objects include birds and runway debris	Wildlife incursion	5
2		U - 1,1 1 100			Bird strike	34
3	\Box				Contaminated Runway	39
4			I .	<u> </u>	Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition	80
_					mays in maintenance technician / an worthiness specialist requirements definition	
5						149
5					process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	149
5					process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	149 150
6					process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction	150
T					process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	
6					process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	150
7					process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.	150
6 7 8					process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Inadequate certification process and / or flaws in methodology concerning verification	150 162 216
7					process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	150
6 7 8					process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Inadequate certification process and / or flaws in methodology concerning verification	150 162 216
6 7 8 9					process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring Flaws in aircraft system maintenance process definition - Landing gear components.	150 162 216 358 401 377
6 7 8 9 10					process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components.	150 162 216 358 401
6 7 8 9	10	Severe Flight Control System Failure	T0108132	Given the occurrence of a flight control system failure, the failure is severe enough to cause a pitch control problem	process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring Flaws in maintenance process definition - Landing gear components. System failure affecting the operation of primary instruments / displays or standby	150 162 216 358 401 377 376
6 7 8 9 10 11 12	10	Severe Flight Control System Failure	T010B132	Given the occurrence of a flight control system failure, the failure is severe enough to cause a pitch control problem	process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components.	150 162 216 358 401 377
6 7 8 9 10 11 12 1	10	Severe Flight Control System Failure	TO108132		process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring. Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. System failure affecting the operation of primary instruments / displays or standby instruments	150 162 216 358 401 377 376



_		Base events	Code	Definition	Identifiable precursors	No.
4					Flaws in manufacturer quality control process - FCS system components	421
5					Flaws in aircraft system maintenance process definition - FCS systems or components	422
11+1	II	Flight crew rejects to take-off			Flight crew rejects to take-off	
				The pilot misdiagnoses the situation and either fails to realise what is causing the pitch control problems or wrongly attributes them to		
1	11	Crew Misdiagnose Situation	TO10B211	something else.	Pilot tiredness - Inadequate workload distribution	167
3					Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, failure recognition and preparedness	168 209
4					Wildlife incursion	5
5					System failure affecting the operation of primary instruments / displays or standby instruments	26
6					Bird strike	34
7 8					Contaminated Runway Tire burst	39 80
H					Flaws in maintenance technician / airworthiness specialist requirements definition	
9					process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	149
10					distribution	150
11					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
12					Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162
13					Pilot tiredness - Inadequate workload distribution	167
14					Flaws in pilot requirements definition process and/or training methodology	168
15					Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.	198
					Lack of adherence to SOP for take-off procedure in terms of checking take-off	
16					configuration before application of take-off power. Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence	201
17					of contaminations.	216
18					Incorrect stab-trim setting	258
					Inadequate certification process and / or flaws in methodology concerning verification	
19 20					of the system / product compliance with requirements - Landing gear components Slow rotation (i.e., low pitch rate)	358 371
20					Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence	3/1
21					integrity monitoring Lack of adherence to SOP for take-off procedure in terms of speed bug checklist	401
22					preparation and verification.	419
					Inadequate certification process and / or flaws in methodology concerning verification	
23					of the system / product compliance with requirements - FCS system or components	420
24					Flaws in manufacturer quality control process - FCS system components	421
25				1		
					Flaws in aircraft system maintenance process definition - FCS systems or components	422
26					Flaws in aircraft system maintenance process definition - Landing gear components.	377
26 27				The flight crew diagnoses the situation, realising what is causing the		
27	12	Crew Misjudge Situation	TO10B212	pitch control problems but misjudges the situation and incorrectly	Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components.	377 376
	12	Crew Misjudge Situation	TO10B212		Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	377
27	12	Crew Misjudge Situation	TO10B212	pitch control problems but misjudges the situation and incorrectly	Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP	377 376 167 168
27	12	Crew Misjudge Situation	TO10B212	pitch control problems but misjudges the situation and incorrectly	Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	377 376 167
27	12	Crew Misjudge Situation	TO10B212	pitch control problems but misjudges the situation and incorrectly	Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Wildlife incursion System failure affecting the operation of primary instruments / displays or standby	377 376 167 168 207 5
27	12	Crew Misjudge Situation	TO108212	pitch control problems but misjudges the situation and incorrectly	Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Wildlife incursion	377 376 167 168 207
1 2 3 4	12	Crew Misjudge Situation	TO108212	pitch control problems but misjudges the situation and incorrectly	Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Wildlife incursion System failure affecting the operation of primary instruments / displays or standby instruments Bird strike Contaminated Runway	377 376 167 168 207 5 26 34 39
1 2 3 4	12	Crew Misjudge Situation	TO108212	pitch control problems but misjudges the situation and incorrectly	Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Wildlife incursion System failure affecting the operation of primary instruments / displays or standby instruments Bird strike	377 376 167 168 207 5 26 34
1 2 3 4	12	Crew Misjudge Situation	T0108212	pitch control problems but misjudges the situation and incorrectly	Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Wildlife incursion System failure affecting the operation of primary instruments / displays or standby instruments Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	377 376 167 168 207 5 26 34 39
1 2 3 4	12	Crew Misjudge Situation	T0108212	pitch control problems but misjudges the situation and incorrectly	Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Wildlife incursion System failure affecting the operation of primary instruments / displays or standby instruments Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition	377 376 167 168 207 5 26 34 39 80
1 2 3 4 5 6 7 8 9	12	Crew Misjudge Situation	T0108212	pitch control problems but misjudges the situation and incorrectly	Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Wildlife incursion System failure affecting the operation of primary instruments / displays or standby instruments Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	377 376 167 168 207 5 26 34 39 80 149
1 2 3 4 5 6 7 8	12	Crew Misjudge Situation	T0108212	pitch control problems but misjudges the situation and incorrectly	Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Wildlife incursion System failure affecting the operation of primary instruments / displays or standby instruments Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	377 376 167 168 207 5 26 34 39 80
27 1 2 3 4 5 6 7 8 9 10	12	Crew Misjudge Situation	T0108212	pitch control problems but misjudges the situation and incorrectly	Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Wildlife incursion System failure affecting the operation of primary instruments / displays or standby instruments Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	377 376 167 168 207 5 26 34 39 80 149 150
1 2 3 4 5 6 7 8 9 10 11 12 13	12	Crew Misjudge Situation	T0108212	pitch control problems but misjudges the situation and incorrectly	Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Wildlife incursion System failure affecting the operation of primary instruments / displays or standby instruments Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Pilot tiredness - Inadequate workload distribution	377 376 167 168 207 5 26 34 39 80 149 150 151
1 2 3 4 5 6 7 8 9 10 11 12 13 14	12	Crew Misjudge Situation	T0108212	pitch control problems but misjudges the situation and incorrectly	Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Wildlife incursion System failure affecting the operation of primary instruments / displays or standby instruments Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to ISAO Pfor take-off procedure in terms of determining of aircraft	377 376 168 207 5 26 34 39 80 149 150 151 162 167 168
1 2 3 4 5 6 7 8 9 10 11 12 13	12	Crew Misjudge Situation	T0108212	pitch control problems but misjudges the situation and incorrectly	Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Wildlife incursion System failure affecting the operation of primary instruments / displays or standby instruments Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.	377 376 167 168 207 5 26 34 39 80 149 150 151
1 2 3 4 5 6 7 8 9 10 11 12 13 14	12	Crew Misjudge Situation	T0108212	pitch control problems but misjudges the situation and incorrectly	Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Wildlife incursion System failure affecting the operation of primary instruments / displays or standby instruments Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	377 376 168 207 5 26 34 39 80 149 150 151 162 167 168
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	12	Crew Misjudge Situation	T0108212	pitch control problems but misjudges the situation and incorrectly	Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Wildlife incursion System failure affecting the operation of primary instruments / displays or standby instruments Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction proceedure Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off	377 376 167 168 207 5 26 34 39 80 149 150 151 162 167 168 198 201
27 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	12	Crew Misjudge Situation	T0108212	pitch control problems but misjudges the situation and incorrectly	Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Wildlife incursion System failure affecting the operation of primary instruments / displays or standby instruments Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction proceedure Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	377 376 168 207 5 26 34 39 80 149 150 151 162 167 168
1 2 3 4 4 5 6 7 7 8 8 9 10 11 12 13 14 15 16 17	12	Crew Misjudge Situation	T0108212	pitch control problems but misjudges the situation and incorrectly	Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Wildlife incursion System failure affecting the operation of primary instruments / displays or standby instruments Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off prover. Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.	377 376 168 207 5 26 34 39 80 149 150 151 162 167 168 198
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18	12	Crew Misjudge Situation	T0108212	pitch control problems but misjudges the situation and incorrectly	Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Wildlife incursion System failure affecting the operation of primary instruments / displays or standby instruments Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to ICAO Annex 14 SARPs in terms of determining of aircraft configuration Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Incorrect stab-trim setting Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	377 376 167 168 207 5 26 34 39 80 149 150 151 162 167 168 198 201 216 228 338
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	12	Crew Misjudge Situation	T0108212	pitch control problems but misjudges the situation and incorrectly	Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Wildlife incursion System failure affecting the operation of primary instruments / displays or standby instruments Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Incorrect stab-trim setting Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Slow rotation (i.e., low pitch rate)	377 376 167 168 207 5 26 34 39 80 149 150 151 162 167 168 198 201 201 201 201 201 201 201 201
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18	12	Crew Misjudge Situation	T0108212	pitch control problems but misjudges the situation and incorrectly	Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Wildlife incursion System failure affecting the operation of primary instruments / displays or standby instruments Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Incorrect stab-trim setting Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Slow rotation (i.e., low pitch rate) Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	377 376 167 168 207 5 26 34 39 80 149 150 151 162 167 168 198 201 216 228 338
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18	12	Crew Misjudge Situation	T0108212	pitch control problems but misjudges the situation and incorrectly	Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Wildlife incursion System failure affecting the operation of primary instruments / displays or standby instruments Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Incorrect stab-trim setting Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Slow rotation (i.e., low pitch rate) Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring Lack of adherence to SOP for take-off procedure in terms of speed bug checklist	3777 376 167 168 207 5 26 34 39 80 149 150 151 162 168 201 216 258 358 371 401
1 1 2 3 3 4 4 5 6 6 7 7 8 8 9 10 11 12 13 14 15 16 17 18 19 20 10 10 10 10 10 10 10 10 10 10 10 10 10	12	Crew Misjudge Situation	T0108212	pitch control problems but misjudges the situation and incorrectly	Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Wildlife incursion System failure affecting the operation of primary instruments / displays or standby instruments Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Incorrect stab-trim setting Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Slow rotation (i.e., low pitch rate) Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	377 376 167 168 207 5 26 34 39 149 150 151 162 167 168 198 201 216 228 338
1 2 3 4 5 6 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	12	Crew Misjudge Situation	T0108212	pitch control problems but misjudges the situation and incorrectly	Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Wildlife incursion System failure affecting the operation of primary instruments / displays or standby instruments Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Incorrect stab-trim setting Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Slow rotation (i.e., low pitch rate) Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring Lack of adherence to SOP for take-off procedure in terms of speed bug checklist preparation and verification.	377 376 167 168 207 5 26 34 39 80 149 150 151 162 167 168 198 201 216 258 371 401 419
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18	12	Crew Misjudge Situation	T0108212	pitch control problems but misjudges the situation and incorrectly	Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Wildlife incursion System failure affecting the operation of primary instruments / displays or standby instruments Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to ICAO Annex 14 SARPs in terms of determining of aircraft configuration. Lack of adherence to ICAO Annex 14 SARPs in terms of RWVY mainternance - presence of contaminations. Incorrect stab-trim setting Inadequate certification process and / or flaws in methodology concerning verification of take-off power. Lack of adherence to ICAO Annex 14 SARPs in terms of RWVY mainternance - presence of contaminations. Incorrect stab-trim setting Lack of adherence to SAPPs include with requirements - Landing gear components Slow rotation (i.e., low pitch rate) Lack of adherence to SAPPs include with requirements - Landing gear components Slow rotation (i.e., low pitch rate) Lack of adherence to SAPPs include in ICAO Annex 14 in terms of airport fence integrity monitoring Lack of adherence to SOP for take-off procedure in terms of speed bug checklist preparation and verification.	3777 376 167 168 207 5 26 34 39 80 149 150 151 162 168 201 216 258 358 371 401
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18	12	Crew Misjudge Situation	T0108212	pitch control problems but misjudges the situation and incorrectly	Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Wildlife Incursion System failure affecting the operation of primary instruments / displays or standby instruments Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Incorrect stab-trim setting Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Slow rotation (i.e., low pitch rate) Lack of adherence to SAPRs included in ICAO Annex 14 in terms of airport fence integrity monitoring Lack of adherence to SAPRs included in ICAO Annex 14 in terms of speed bug checklist preparation and verification.	3777 376 167 168 207 5 26 34 39 80 149 150 151 162 168 198 201 216 258 338 371 401



26		Base events	Code	Definition	Identifiable precursors	No.
					Flaws in aircraft system maintenance process definition - Landing gear components.	377
27				If the take-off is rejected when the aircraft is below V1 then this is a	Flaws in manufacturer quality control process - Landing gear components.	376
		Take-off rejected correctly when below		success, but it must be included to obtain the pivotal event		
1	13	V1	TO10B22	probability.	not identifiable at that level	
2					Wildlife incursion	5
					System failure affecting the operation of primary instruments / displays or standby	
4					instruments	26 34
5					Bird strike Contaminated Runway	39
6					Tire burst	80
Ť					Flaws in maintenance technician / airworthiness specialist requirements definition	
7					process and/or training methodology	149
					Maintenance technician / airworthiness specialist tiredness - Inadequate workload	
8					distribution	150
9					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
9					Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction	151
10					procedure	162
11					Pilot tiredness - Inadequate workload distribution	167
12					Flaws in pilot requirements definition process and/or training methodology	168
					Lack of adherence to SOP for take-off procedure in terms of determining of aircraft	
L3					configuration.	198
					Lack of adherence to SOP for take-off procedure in terms of checking take-off	201
14			 	+	configuration before application of take-off power. Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence	201
15			1		of contaminations.	216
16			 		Incorrect stab-trim setting	258
+						
					Inadequate certification process and / or flaws in methodology concerning verification	1
L7					of the system / product compliance with requirements - Landing gear components	358
.8					Slow rotation (i.e., low pitch rate)	371
			1		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence	
9					integrity monitoring Lack of adherence to SOP for take-off procedure in terms of speed bug checklist	40:
0!					preparation and verification.	419
+					preparation and vermedation.	123
					Inadequate certification process and / or flaws in methodology concerning verification	
1					of the system / product compliance with requirements - FCS system or components	420
2					Flaws in manufacturer quality control process - FCS system components	421
3					Flaws in aircraft system maintenance process definition - FCS systems or components	422
4					Flaws in aircraft system maintenance process definition - Landing gear components.	377 376
25			1		Flaws in manufacturer quality control process - Landing gear components.	3/6
\neg						
1+						
		Failure to achieve maximum braking			Failure to achieve maximum braking	
+ -		Failure to achieve maximum braking		The runway is too short under wet or icy runway conditions for the	Failure to achieve maximum braking	
		-		plane to come to a halt even if the take-off is aborted before V1 is	-	
1 111	14	Failure to achieve maximum braking Insufficient Runway Length	TO10B31		Convective weather - heavy rain resulted with wet RWY surface	75
1 2	14	-	TO10B31	plane to come to a halt even if the take-off is aborted before V1 is	Convective weather - heavy rain resulted with wet RWY surface Pilot tiredness - Inadequate workload distribution	167
1 2	14	-	TO10B31	plane to come to a halt even if the take-off is aborted before V1 is	Convective weather - heavy rain resulted with wet RWY surface Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168
1 2	14	-	TO10B31	plane to come to a halt even if the take-off is aborted before V1 is	Convective weather - heavy rain resulted with wet RWY surface Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Gross error in takeoff weight entry and/or in V1 / VR speeds assessment	167 168
1 2	14	-	TO10B31	plane to come to a halt even if the take-off is aborted before V1 is	Convective weather - heavy rain resulted with wet RWY surface Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168
1 1 2	14	-	TO10B31	plane to come to a halt even if the take-off is aborted before V1 is	Convective weather - heavy rain resulted with wet RWY surface Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Gross error in takeoff weight entry and/or in V1 / VR speeds assessment Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of	
1 2 3 4	14	-	T010B31	plane to come to a halt even if the take-off is aborted before V1 is	Convective weather - heavy rain resulted with wet RWY surface Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Gross error in takeoff weight entry and/or in V1 / VR speeds assessment Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum	167 168 179 203
1 2 3 4 5 6	14	-	T010B31	plane to come to a halt even if the take-off is aborted before V1 is	Convective weather - heavy rain resulted with wet RWY surface Pilot tiredness - inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Gross error in takeoff weight entry and/or in V1 / VR speeds assessment Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum High energy RTO rate is an indicator of improper Operator's policy for T/O operations.	167 168 179 203
11 11 22 2 33 44 55 66 77	14	-	T010B31	plane to come to a halt even if the take-off is aborted before V1 is	Convective weather - heavy rain resulted with wet RWY surface Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Gross error in takeoff weight entry and/or in V1 / VR speeds assessment inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum High energy RTO rate is an indicator of improper Operator's policy for T/O operations. Poor application of T/O & RTO procedure, computation of T/O parameters	168 179 203 211 260
1 1 2 2 3 3 4 4 5 5 6 7 7	14	-	TO10831	plane to come to a halt even if the take-off is aborted before V1 is	Convective weather - heavy rain resulted with wet RWY surface Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Gross error in takeoff weight entry and/or in VI / VR speeds assessment Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum High energy RTO rate is an indicator of improper Operator's policy for T/O operations. Poor application of T/O & RTO procedure, computation of T/O parameters Wildlife Incursion	167 168 179 203 211 260
1 11 22 33 3 44 55 5	14	-	TO10831	plane to come to a halt even if the take-off is aborted before V1 is	Convective weather - heavy rain resulted with wet RWY surface Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Gross error in takeoff weight entry and/or in V1 / VR speeds assessment Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum High energy RTO rate is an indicator of improper Operator's policy for T/O operations. Poor application of T/O & RTO procedure, computation of T/O parameters Wildlife incursion System failure affecting the operation of primary instruments / displays or standby	20: 20: 21:
1 III 1 22 33 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	14	-	T010831	plane to come to a halt even if the take-off is aborted before V1 is	Convective weather - heavy rain resulted with wet RWY surface Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Gross error in takeoff weight entry and/or in VI / VR speeds assessment Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum High energy RTO rate is an indicator of improper Operator's policy for T/O operations. Poor application of T/O & RTO procedure, computation of T/O parameters Wildlife Incursion	20 21 26
1 III 1 2 2 3 3 4 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	14	-	T010B31	plane to come to a halt even if the take-off is aborted before V1 is	Convective weather - heavy rain resulted with wet RWY surface Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Gross error in takeoff weight entry and/or in V1 / VR speeds assessment Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum High energy RTO rate is an indicator of improper Operator's policy for T/O operations. Poor application of T/O & RTO procedure, computation of T/O parameters Wildlife incursion System failure affecting the operation of primary instruments / displays or standby instruments	20 21 26 23
1 III 1 22 33 44 55 5 5 66 67 7 9 9 9 11	14	-	T010B31	plane to come to a halt even if the take-off is aborted before V1 is	Convective weather - heavy rain resulted with wet RWY surface Pilot tiredness - inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Gross error in takeoff weight entry and/or in V1 / VR speeds assessment Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum High energy RTO rate is an indicator of improper Operator's policy for T/O operations. Poor application of T/O & RTO procedure, computation of T/O parameters Wildlife incursion System failure affecting the operation of primary instruments / displays or standby instruments Bird strike Contaminated Runway Tire burst	200 21 26 23 33
11 11 22 33 44 55 66 77 88 99 00 11 22 1	14	-	TO10831	plane to come to a halt even if the take-off is aborted before V1 is	Convective weather - heavy rain resulted with wet RWY surface Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Gross error in takeoff weight entry and/or in VI / VR speeds assessment Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum High energy RTO rate is an indicator of improper Operator's policy for T/O operations. Poor application of T/O & RTO procedure, computation of T/O parameters Wildlife incursion System failure affecting the operation of primary instruments / displays or standby instruments Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition	203 213 266 34 36 80
1 III 1 2 2 3 3 4 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	14	-	T010831	plane to come to a halt even if the take-off is aborted before V1 is	Convective weather - heavy rain resulted with wet RWY surface Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Gross error in takeoff weight entry and/or in V1 / VR speaks assessment Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum High energy RTO rate is an indicator of improper Operator's policy for T/O operations. Poor application of T/O & RTO procedure, computation of T/O parameters Wildlife incursion System failure affecting the operation of primary instruments / displays or standby instruments Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	20 21 26 23 33 8
1 III 1 2 3 3 4 5 5 5 6 6 7 7 8 8 9 9 1 1 1 2 2 1 3 3 3 4 5 6 6 7 7 7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	14	-	T010B31	plane to come to a halt even if the take-off is aborted before V1 is	Convective weather - heavy rain resulted with wet RWY surface Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Gross error in takeoff weight entry and/or in V1 / VR speeds assessment Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum High energy RTO rate is an indicator of improper Operator's policy for T/O operations. Poor application of T/O & RTO procedure, computation of T/O parameters Wildlife incursion System failure affecting the operation of primary instruments / displays or standby instruments Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	20 21 26 23 33 38
1 III 1 2 2 3 3 4 3 4 5 5 5 5 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	14	-	TO10B31	plane to come to a halt even if the take-off is aborted before V1 is	Convective weather - heavy rain resulted with wet RWY surface Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Gross error in takeoff weight entry and/or in VI / VR speeds assessment Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum High energy RTO rate is an indicator of improper Operator's policy for T/O operations. Poor application of T/O & RTO procedure, computation of T/O parameters Wildlife incursion System failure affecting the operation of primary instruments / displays or standby instruments Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	200 211 266 213 34 381
1	14	-	TO10831	plane to come to a halt even if the take-off is aborted before V1 is	Convective weather - heavy rain resulted with wet RWY surface Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Gross error in takeoff weight entry and/or in V1 / VR speeds assessment Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum High energy RTO rate is an indicator of improper Operator's policy for T/O operations. Poor application of T/O & RTO procedure, computation of T/O parameters Wildlife incursion System failure affecting the operation of primary instruments / displays or standby instruments Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	200 211 266 33 31 86 149
1 III 1 2 3 3 4 4 5 5 5 6 6 7 7 8 8 9 9 0 1 1 2 2 3 3 4 4 4 4 4 6 6 6 6 6 6 6 6 6 6 6 6 6	14	-	TO10831	plane to come to a halt even if the take-off is aborted before V1 is	Convective weather - heavy rain resulted with wet RWY surface Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Gross error in takeoff weight entry and/or in V1 / VR speeds assessment Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum High energy RTO rate is an indicator of improper Operator's policy for T/O operations. Poor application of T/O & RTO procedure, computation of T/O parameters Wildlife incursion System failure affecting the operation of primary instruments / displays or standby instruments Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	200 211 266 33 31 86 149
1	14	-	T010B31	plane to come to a halt even if the take-off is aborted before V1 is	Convective weather - heavy rain resulted with wet RWY surface Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Gross error in takeoff weight entry and/or in V1 / VR speeds assessment Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum High energy RTO rate is an indicator of improper Operator's policy for T/O operations. Poor application of T/O & RTO procedure, computation of T/O parameters Wildlife incursion System failure affecting the operation of primary instruments / displays or standby instruments Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	20: 21: 26: 3: 3: 8: 14:
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decision	32						168
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8 Tire burst 9 Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology 145 Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution 15 Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties 15 Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure 16 Pilot tiredness - Inadequate workload distribution 16 Flaws in pilot requirements definition process and/or training methodology 16 Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. 18 Lack of adherence to SOP for take-off procedure in terms of checking take-off	_						34
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13 Pilot tiredness - Inadequate workload distribution 167 14 Flaws in pilot requirements definition process and/or training methodology 168 15 Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. 198 15 Lack of adherence to SOP for take-off procedure in terms of checking take-off leach of adherence to SOP for take-off procedure in terms of checking take-off leach of adherence to SOP for take-off procedure in terms of checking take-off	12						162
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15 configuration. 198 Lack of adherence to SOP for take-off procedure in terms of checking take-off	14						168
Lack of adherence to SOP for take-off procedure in terms of checking take-off	15						100
	15			+			198
	16						201



		Base events	Code	Definition	Identifiable precursors	No.
					Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence	
17 18					of contaminations. Incorrect stab-trim setting	216 258
10					incorrect stap-trini setting	236
					Inadequate certification process and / or flaws in methodology concerning verification	
19 20					of the system / product compliance with requirements - Landing gear components	358 371
20					Slow rotation (i.e., low pitch rate) Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence	3/1
21					integrity monitoring	401
					Lack of adherence to SOP for take-off procedure in terms of speed bug checklist	
22					preparation and verification.	419
					Inadequate certification process and / or flaws in methodology concerning verification	
23					of the system / product compliance with requirements - FCS system or components	420
24					Flaws in manufacturer quality control process - FCS system components	421
25					Flaws in aircraft system maintenance process definition - FCS systems or components	422
26					Flaws in aircraft system maintenance process definition - Landing gear components.	377
27					Flaws in manufacturer quality control process - Landing gear components.	376
28					Pilot tiredness - Inadequate workload distribution	167
29					Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP	168
30					decision	207
31					Poor application of T/O & RTO procedure, failure recognition and preparedness	209
IV+						
-	IV	Aircraft fails to rotate and lift off		Flight crew fail to diagnose the cause of the pitch control problems	Aircraft fails to rotate and lift off	\vdash
1	17	Pitch Control Misdiagnosed	TO10B41	and hence fails to rectify the problem.	Pilot tiredness - Inadequate workload distribution	167
2				, p	Flaws in pilot requirements definition process and/or training methodology	168
3					Poor application of T/O & RTO procedure, aircraft handling	388
4					Wildlife incursion System failure affecting the operation of primary instruments / displays or standby	5
5					instruments	26
6					Bird strike	34
7					Contaminated Runway	39
8					Tire burst	80
9					Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
					Maintenance technician / airworthiness specialist tiredness - Inadequate workload	
10					distribution	150
					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	454
11					or / and passive contribution to the PF duties Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction	151
12					procedure	162
13					Pilot tiredness - Inadequate workload distribution	167
14					Flaws in pilot requirements definition process and/or training methodology	168
15					Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.	198
13					Lack of adherence to SOP for take-off procedure in terms of checking take-off	130
16					configuration before application of take-off power.	201
اا					Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence	
17 18					of contaminations. Incorrect stab-trim setting	216 258
10					incorrect stab trim setting	230
					Inadequate certification process and / or flaws in methodology concerning verification	
19					of the system / product compliance with requirements - Landing gear components	358
20					Slow rotation (i.e., low pitch rate) Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence	371
21					integrity monitoring	401
					Lack of adherence to SOP for take-off procedure in terms of speed bug checklist	
22					preparation and verification.	419
					Inadequate certification process and / or flaws in methodology concerning verification	
23					of the system / product compliance with requirements - FCS system or components	420
24	_				Flaws in manufacturer quality control process - FCS system components	421
2.					Flows in aircraft system maintanance process definition FCC	422
25 26					Flaws in aircraft system maintenance process definition - FCS systems or components Flaws in aircraft system maintenance process definition - Landing gear components.	422 377
27					Flaws in manufacturer quality control process - Landing gear components.	376
	_			Flight crew diagnoses the causes of the pitch control problem but		
1	18	Unsucessful Pitch Control Rectification	TO10B42	fails to rectify it	Pilot tiredness - Inadequate workload distribution	167 168
2 3					Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling	388
4					Wildlife incursion	5
4					Wildlife incursion System failure affecting the operation of primary instruments / displays or standby	
4 5					Wildlife incursion System failure affecting the operation of primary instruments / displays or standby instruments	26
4					Wildlife incursion System failure affecting the operation of primary instruments / displays or standby instruments Bird strike	
4 5 6					Wildlife incursion System failure affecting the operation of primary instruments / displays or standby instruments	26 34
5 6 7 8					Wildlife incursion System failure affecting the operation of primary instruments / displays or standby instruments Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition	26 34 39 80
5 6 7					Wildlife incursion System failure affecting the operation of primary instruments / displays or standby instruments Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	26 34 39
5 6 7 8					Wildlife incursion System failure affecting the operation of primary instruments / displays or standby instruments Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition	26 34 39 80
5 6 7 8					Wildlife incursion System failure affecting the operation of primary instruments / displays or standby instruments Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	26 34 39 80 149
5 6 7 8					Wildlife incursion System failure affecting the operation of primary instruments / displays or standby instruments instruments Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	26 34 39 80 149
5 6 7 8 9					Wildlife incursion System failure affecting the operation of primary instruments / displays or standby instruments instruments. Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction	26 34 39 80 149 150
5 6 7 8 9 10 11					Wildlife incursion System failure affecting the operation of primary instruments / displays or standby instruments instruments Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	26 34 39 80 149 150 151
5 6 7 8 9 10					Wildlife incursion System failure affecting the operation of primary instruments / displays or standby instruments Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist triedness - inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	26 34 39 80 149 150
5 6 7 8 9 10 11 12 13					Wildlife incursion System failure affecting the operation of primary instruments / displays or standby instruments Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Pilot tiredness - Inadequate workload distribution	26 34 39 80 149 150 151 162 167



	Base events	Code	Definition	Identifiable precursors	No.
				Lack of adherence to SOP for take-off procedure in terms of checking take-off	
16				configuration before application of take-off power.	201
				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence	
17				of contaminations.	216
18				Incorrect stab-trim setting	258
				Inadequate certification process and / or flaws in methodology concerning verification	
19				of the system / product compliance with requirements - Landing gear components	358
20				Slow rotation (i.e., low pitch rate)	371
				Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence	П
21				integrity monitoring	401
				Lack of adherence to SOP for take-off procedure in terms of speed bug checklist	П
22				preparation and verification.	419
				Inadequate certification process and / or flaws in methodology concerning verification	
23				of the system / product compliance with requirements - FCS system or components	420
24				Flaws in manufacturer quality control process - FCS system components	421
25				Flaws in aircraft system maintenance process definition - FCS systems or components	422
26				Flaws in aircraft system maintenance process definition - Landing gear components.	377
27				Flaws in manufacturer quality control process - Landing gear components.	376



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Important ATC claramitic causes ITC					23	37, 30, 33,	00, 01, 02, 03
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Data interpretation by pilot causes ITC			executed due to incorrect ATC clearances. This only covers cases				61; 62; 63
Document preparation by polic causes ITC A357522 General manual registery command during approach by a pilet in piposession of the cincumstrate of the cincumstr			where incorrect clearances directly cause the pilot to command				
Sourcested trajectories value 1,000 1,00			flight towards terrain.				
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							b2; b3
In Common	7 Violation of procedures by pilot save	ος Δ135F524			15: 16: 17: 10: 20: 22:	26: 27: 26: 27: 20: 20:	50- 51- 56- 57- 50- 6
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B					[-1, 02, 03
Internal	8 Incorrect trajectory conflicts with	AL35F53			15: 16: 17: 20: 23:	26: 36: 37: 38: 39:	48; 50; 51; 54; 55; 5
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and marigational beacon failures not recognised by flight rere or PMS it includes failures of NGTM afformation to warn the flight crew about raised grotelems. 10 On-board nav equipment failure causes A135f6212 (see an IMS trajectory command during approach, an ITC is executed due to or board raisegational equipment failure. By the A15f6213 (see an IMS trajectory command during approach, an ITC is executed due to failure modes. 11 Faiter ILS capture causes ITC A135f6214 (see an IMS trajectory command during approach, an ITC is executed due to FMS database error. 12 FMS nav database error causes ITC A135f6214 (see an IMS trajectory command during approach, an ITC is executed due to FMS database error. 13 FMS fault causes ITC A135f623 (see an IMS trajectory command during approach, an ITC is executed due to FMS database error. 14 FMS injuncteror by flight crew causes. TMS A135f621 (see an IMS trajectory command during approach, an ITC is executed due to FMS database error. 14 FMS fault causes ITC A135f623 (see an IMS trajectory command during approach, an ITC is executed due to FMS database error. 15 FMS fault causes ITC A135f624 (see an IMS trajectory command during approach, an ITC is executed due to FMS database error. 16 FMS fault causes ITC A135f627 (see an IMS trajectory command during approach, an ITC is executed due to FMS database error. 17 FMS fault causes ITC A135f627 (see an IMS trajectory command during approach, an ITC is executed due to FMS database error. 18 FMS fault causes ITC A135f627 (see an IMS trajectory command during approach, an ITC is executed due to FMS database error. 19 FMS fault causes ITC A135f627 (see an ITC is executed by FMS, the trajectory is in conflict with trajectory command during approach, an ITC is executed due to FMS database error. 18 FMS fault causes ITC A135f627 (see an ITC is executed by FMS, the trajectory is in conflict with trajectory command during approach, an ITC is executed by FMS, the trajectory is in conflict with terrain. 19 Inspire crew CMM fail				·			56; 57; 58; 59; 60; 6
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Given an FMS Trajectory command during approach, an TIC is executed due to no host an waystening expression and the supering approach, an TIC is executed due to no host and margitational expression in the analyzistonal receivers not recognised by the profile receiver of FMS. The margitational receivers not recognised by the profile receiver of FMS. The margitational receivers not recognised by the profile receiver of FMS. The margitational receivers not recognised by the profile receiver of FMS. The margitational receivers not recognised by the first receiver of FMS. The margitation of FMS and database error causes TTC AL35F621 Al35F621 Al35F621 Al35F621 Al35F621 Al35F621 Al35F621 Al35F622 Al35F622 Al35F623 Al35F62			FMS. It includes failures of NOTAM information to warn the flight				
Processing Description D							
Comprises failures in the navigational receivers not recognised by fight crew or TASI. Imprised below for awareness of equipment failure modes.		es AL35F6212		3;			50; 51; 54; 55; 56; 5
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12 Missus of FMS by flight crew causes ITC A135F6214 Given an FMS trajectory command during approach, an ITC is executed due to flight tree wron in tendequate command curing approach, an ITC is executed due to flight tree word in indequate command curing approach, an ITC is executed due to the flight crew ord in indequate command curing approach, an ITC is executed due to the flight crew ord in indequate command curing approach, an ITC is executed due to the flight crew ord in indequate command curing approach, an ITC is executed due to the flight crew ord in indequate command curing approach, an ITC is executed due to flight crew ord in indequate command curing approach, an ITC is executed due to flight crew ord in indequate command curing approach, an ITC is executed due to flight crew ord in independent monitoring ord PNF by unplanned events A135F624 Given an ATC trajectory command during approach, an ITC is executed due to flight crew ord in independent monitoring, and an ITC is executed due to flight crew ord in independent monitoring, and an ITC is executed due to flight tree word in independent monitoring, and an ITC is executed due to flight tree word in independent monitoring, and an ITC is executed due to flight tree word in independent command (ITC) and independent monitor with eterain A135F624 Given an ATC trajectory command during approach, an ITC is executed due to the flight crew ord command furing approach, an ITC is executed due to the flight crew ord command furing approach, an ITC is executed due to the flight crew ord command furing approach, an ITC is executed due to the flight crew ord command during approach, an ITC is executed due to the flight crew ord command during approach, an ITC is executed due to the flight crew ord command during approach, an ITC is executed due to the flight crew ord command during approach, an ITC is executed due to the flight crew. Order to an ITC is executed by ATC, the trajectory command during approach, an ITC is executed due to the flight cre	11 Faise ILS capture causes ITC	AL35F6213			15; 16; 17; 20; 23;	26; 37; 38; 39;	50; 51; 59; 60; 61; 6
Secured due to FMS database error. 25 35; 60, 61, 62, 62, 63 63, 61, 62, 63 64, 64, 64, 64, 64, 64, 64, 64, 64, 64,	12 EMS nav database error sauses ITC	AL 2556214		2.	15-16-17-19-21-24-	26- 27- 21- 22- 27- 20-	EO- E1- E4- EE- E0- E
13 MF fault causes ITC AL35F622 Siven an FMS trajectory command during approach, an ITC is executed due to flight crew error in entering commands into the FMS hardware sort of the flight crew error in entering commands into the FMS hardware in entering commands into the FMS hardware in entering commands into the FMS hardware in entering commands into the FMS hardware in entering commands into the FMS hardware in entering commands into the FMS hardware in entering command during approach, an ITC is executed due to flight crew trying to make the FMS perform manocurves it is not intended to the flight crew trying to make the FMS perform manocurves it is not intended to the flight crew trying to make the FMS perform manocurves it is not intended to the flight crew trying to make the FMS perform manocurves it is not intended to the flight crew trying to make the FMS perform manocurves it is not intended to the flight crew trying to make the FMS perform manocurves it is not intended to the flight crew trying to make the FMS perform manocurves it is not intended to the flight crew trying to make the FMS perform manocurves it is not intended to the flight crew trying to make the FMS perform manocurves it is not intended to the flight crew trying to make the FMS perform manocurves it is not intended to the flight crew trying to make the FMS perform manocurves it is not intended to the creation that the train is not intended to ever the FMS perform manocurves it is not intended to ever the FMS perform manocurves it is not intended to ever the FMS perform manocurves it is not intended to ever the FMS perform manocurves it is not intended to ever the FMS perform manocurves it is not intended to ever the FMS perform manocurves it is not intended to ever the FMS perform manocurves it is not intended to ever the FMS perform manocurves it is not intended to ever the FMS perform manocurves it is not intended to ever the FMS perform manocurves it is not intended to ever the FMS perform manocurves it is not intended to ever	12 TIVIS TIAV GALADASE ETTOT CAUSES TTC	AL3310214		3,			
executed due to FMS hardware or software fault. 25 39; 60, 61, 62, 63 At FMS input error by flight crew causes AL35F623 Siven an FMS trajectory command during approach, an ITC is executed due to flight crew virty for make the FMS perform manoeuvres it is not intended to. 15, 16, 17, 18, 21; 24; 26, 27, 31; 33; 37, 38; 50, 51; 54; 55; AL35F624 Siven an FMS trajectory command during approach, an ITC is executed due to flight crew virty for make the FMS perform manoeuvres it is not intended to. 15, 16, 17, 18, 21; 24; 26, 27, 31; 33; 37, 38; Al55F624 Siven an FMS trajectory command during approach, an ITC is executed flow to flight crew virty for make the FMS perform manoeuvres it is not intended to. 15, 16, 17, 20, 23; 26, 36, 37, 38; 39; 48, 50, 51; 54; 55; Al55F624 Siven an FMS trajectory command during approach, an ITC is executed flow to remain an ACT rejectory command during approach, an ITC is executed due to errors by the ATCO. 15, 16, 17, 20, 23; 26, 36, 37, 38; 39; 30, 51; 54; 55; Al55F624 Siven an ACT rejectory command during approach, an ITC is executed due to inadequate communication with pilot AL35F721 Siven an ACT rejectory command during approach, an ITC is executed due to inadequate communication between the ATCO and flight crew. 15, 16, 17, 20, 23; 26, 36, 37, 38; 39; 50, 51; 54; 55; Al55F723 Siven an ACT rejectory command during approach, an ITC is executed due to inadequate communication between the ATCO and flight crew. 15, 16, 17, 20, 23; 26, 36, 37, 38; 39; 50, 51; 54; 55; Al56F8723 Siven an ACT rejectory command during approach, an ITC is executed due to inadequate communication between the ATCO and flight crew. 15, 16, 17, 18, 20, 21; 26, 37, 31; 33; 39; 30, 50; 51; 51; 51; 51; 51; 51; 51; 51; 51; 51	13 FMS fault causes ITC	AL35F622		3:			50; 51; 54; 55; 58; 5
14 Missiput error by flight crew causes Al35F623 Given an FMS trajectory command during approach, an ITC is executed but follight crew error in entering commands into the FMS by flight crew causes ITC Al35F624 Given an FMS trajectory command during approach, an ITC is executed due to flight crew trying to make the FMS perform manadeuring approach, an ITC is executed due to flight crew trying to make the FMS perform manadeuring approach, an ITC is executed due to flight crew trying to make the FMS perform manadeuring approach, an ITC is executed due to flight crew trying to make the FMS perform manadeuring approach, an ITC is executed due to flight crew trying to make the FMS perform manadeuring approach, an ITC is executed the total flight crew trying to make the FMS perform manadeuring approach, an ITC is executed the total flight crew trying to make the FMS perform manadeuring approach, an ITC is executed the total flight crew manadeuring approach, an ITC is executed the total flight crew manadeuring approach, an ITC is executed the total flight crew manadeuring approach, an ITC is executed the total flight crew in Complying with ATC instructions due to rorns by the ATCO and flight crew. 20 Incorrect trajectory conflicts with cream and trying approach, an ITC is executed due to the flight crew not complying with ATC instructions due to manadeuring approach, an ITC is executed due to the flight crew not complying with ATC instructions due to manadeuring approach, an ITC is executed by ATC, the trajectory is in conflict with terrain in flight crew. 20 Incorrect trajectory conflicts with cream and trying approach, an ITC is executed by ATC, the trajectory is in conflict with terrain in flight crew not complying with ATC instructions due to conflict with terrain in flight crew in the ATCO and the ATCO and trajectory is in conflict with terrain in flight crew in the ATCO and the ATCO and the ATCO and the ATCO and the ATCO and the ATCO and the ATCO and the ATCO and the ATCO and the ATCO and the				-,			
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15 Misuse of FMS by flight crew causes ITC AL35F624 Given an FMS trajectory command during approach, an ITC is executed due to flight crew trying to make the FMS perform 25 36, 36, 37, 38, 39, 39, 48, 50, 51, 54, 54, 55 57, 58, 50, 51, 54, 54, 55 57, 58, 50, 51, 54, 54, 55 57, 58, 50, 51, 54, 54, 55 57, 58, 50, 51, 54, 54, 55 57, 58, 50, 51, 54, 54, 55 57, 58, 54, 54, 54, 54, 54, 54, 54, 54, 54, 54					25	39;	60; 61; 62; 63
Executed due to flight crew trying to make the FMS perform 25 39; 60, 61; 62; 63 63 63, 63; 38; 39; 48, 50; 51; 54; 61; 62; 63 63; 63; 73; 38; 39; 48, 50; 51; 54; 63; 64; 64; 64; 64; 64; 64; 64; 64; 64; 64			FMS.				
manoeuvres It is not intended to.	15 Misuse of FMS by flight crew causes I	TC AL35F624				26; 27; 31; 33; 37; 38;	50; 51; 54; 55; 58; 5
16 Incorrect trajectory conflicts with terrain 15; 16; 17; 20; 23; 26; 36; 37; 38; 39; 48; 50; 51; 54; 57; by ATCO 15; 16; 17; 20; 23; 26; 36; 37; 38; 39; 39; 59; 60; 61; 62; 63; 71; 72; 72; 73; 73; 73; 73; 73; 73; 73; 73; 73; 73					25	39;	60; 61; 62; 63
terrain terrain terrain							
17 Inadequate trajectory command (ITC) A35F721 Siven an ATC trajectory command during approach, an ITC is executed due to errors by the ATCO. 15; 16; 17; 20; 23; 26; 36; 37; 38; 39; 50; 51; 56; 73; 38; 39; 50; 51; 56; 73; 38; 39; 50; 51; 56; 73; 38; 39; 50; 51; 56; 73; 38; 39; 50; 51; 56; 73; 38; 39; 50; 51; 56; 73; 38; 39; 50; 51; 56; 73; 38; 39; 50; 51; 56; 73; 38; 39; 50; 51; 56; 73; 38; 39; 50; 51; 56; 73; 38; 39; 50; 51; 56; 73; 38; 39; 50; 51; 56; 73; 38; 39; 50; 51; 56; 73; 38; 39; 50; 51; 56; 73; 38; 39; 50; 51; 56; 73; 38; 39; 50; 51; 56; 73; 38; 39; 50; 51; 54; 73; 74; 74; 75; 75; 75; 75; 75; 75; 75; 75; 75; 75		AL35F63	The state of the s		15; 16; 17; 20; 23;	26; 36; 37; 38; 39;	
by ATCO executed due to errors by the ATCO.		AL255724			15, 16, 17, 20, 22	26, 26, 27, 20, 20,	
Inadequate communication with pilot Ad35F722 Given an ATC trajectory command during approach, an ITC is executed due to inadequate communication between the ATCO and flight crew.		AL35F/21			15; 16; 17; 20; 23;	20; 30; 37; 38; 39;	
executed due to inadequate communication between the ATCO and flight crew.		Δ135F722			15: 16: 17: 20: 22:	26: 36: 37: 38: 20:	
19 Inadequate pilot response to ATC AL35F723 Given an ATC trajectory command during approach, an ITC is executed by ATC, the trajectory is in conflict with terrain 15; 16; 17; 18; 20; 21; 26; 36; 37; 38; 39; 48; 50; 51; 59; 60; 60; 62; 23; 20 Incorrect trajectory conflicts with al35F73 Given an ITC is executed by ATC, the trajectory is in conflict with terrain 15; 16; 17; 20; 23; 26; 36; 37; 38; 39; 48; 50; 51; 52; 59; 60; 60; 62; 23; 24; 25 35; 36; 37; 38; 39; 48; 50; 51; 52; 59; 60; 60; 62; 23; 24; 25 35; 36; 37; 38; 39; 48; 50; 51; 52; 59; 60; 60; 62; 23; 24; 25 35; 36; 37; 38; 39; 55; 56; 57; 58; 61; 62; 63; 63; 63; 63; 63; 63; 63; 63; 63; 63	20 madequate communication with pilot	NEJ3F/44			10, 10, 11, 20, 23;	20, 30, 31, 30, 39,	
19 Inadequate pilot response to ATC AL35F723 Given an ATC trajectory command during approach, an ITC is executed due to the flight crew not complying with ATC instructions despite giving a correct readack. 23; 26; 36; 37, 38; 39; 50; 51; 59; 60; 63 20 Incorrect trajectory conflicts with terrain AL35F73 Given an ITC is executed by ATC, the trajectory is in conflict with terrain 15; 16; 17; 20; 23; 26; 36; 37, 38; 39; 48; 50; 51; 54; 59; 60; 61; 62; 62; 18; 18; 19; 19; 19; 19; 19; 19; 19; 19; 19; 19							01, 02, 03
executed due to the flight crew not complying with ATC instructions despite giving a correct readback. 20 Incorrect trajectory conflicts with terrain 21 Incorrect trajectory conflicts with terrain 22 Incorrect trajectory conflicts with terrain 23 Incorrect trajectory conflicts with terrain 24 Incorrect trajectory conflicts with terrain 25 Incorrect trajectory conflicts with terrain 26 Incorrect trajectory conflicts with terrain 27 Incorrect trajectory conflicts with terrain 28 Incorrect trajectory conflicts with terrain 29 Incorrect trajectory conflicts with terrain 20 Incorrect trajectory conflicts with terrain 20 Incorrect trajectory conflicts with terrain 20 Incorrect trajectory conflicts with terrain 20 Incorrect trajectory conflicts with terrain 20 Incorrect trajectory conflicts with terrain 20 Incorrect trajectory conflicts with terrain 21 Incorrect trajectory conflicts with terrain 22 Incorrect trajectory conflicts with terrain 23 Incorrect trajectory conflicts with terrain 24 Incorrect trajectory conflicts with terrain 25 Incorrect trajectory conflicts with terrain 26 Incorrect trajectory conflicts with terrain 27 Inexperienced PNF not monitoring PF 28 AlasB4113 Incorrect trajectory conflicts with terrain 29 Inexperienced PNF not monitoring PF 29 Inexperienced PNF not monitoring PF 20 Inexperienced PNF not monitoring PF 20 Inexperienced PNF not monitoring PF 20 Inexperienced PNF not monitoring PF 20 Inexperienced PNF not monitoring PF 20 Inexperienced PNF not monitoring PF 20 Inexperienced PNF not monitoring PF 20 Inexperienced PNF not monitoring PF 21 Inexperienced PNF not monitoring PF 22 Inexperienced PNF not monitoring PF 23 Inexperienced PNF not monitoring PF 23 Inexperienced PNF not monitoring PF 23 Inexperienced PNF not monitoring PF 24 Inexperienced PNF not monitoring PF 25 Inexperienced PNF not monitoring PF 26 Inexperienced PNF not monitoring PF 27 Inexperienced PNF not monitoring PF 28 Inexperienced PNF not monitoring PF 29 Inexperienced PNF not mon	19 Inadequate pilot response to ATC	AL35F723			15: 16: 17: 18: 20: 21:	26: 36: 37: 38: 39:	50; 51; 59; 60; 61; 6
despite giving a correct readback.		1				,,, 55, 55,	II
20 incorrect trajectory conflicts with terrain AL35F73 Given an ITC is executed by ATC, the trajectory is in conflict with terrain IFlight crew CRM failure 21 Lack of fitness of PNF AL35B4111 Given a flight towards terrain being commanded (FTTC), pilot not flying (PNF) fails to detect it due to lack of fitness (e.g. fatigue). 22 Distraction of PNF by unplanned events AL35B4112 Given an FTTC, PNF fails to detect it due to distraction by unplanned events (e.g. unrelated warning messages). 23 Absorption of PNF in routine tasks AL35B4113 Given an FTTC, PNF fails to detect it due to being absorbed in routine duties (e.g. radio communication). 24 PF under instruction by PNF AL35B4121 Given an FTTC, PNF fails to detect it due to being directly instructed by the pilot flying (PF), and hence not performing independent monitoring. 25 Flight crew jointly operating FMS AL35B4123 Given an FTTC, PNF fails to detect it due to looking out for the filight management system (FMS) with the PF, and hence not performing independent monitoring. 26 PNF looking for terrain AL35B4124 Given an FTTC, PNF fails to detect it due to looking out for the terrain, and hence not performing independent monitoring. 27 Inexperienced PNF not monitoring PF AL35B4124 Given an FTTC, PNF fails to detect it due to looking out for the terrain, and hence not performing independent monitoring. 28 Given an FTTC, PNF fails to detect it due to looking out for the terrain, and hence not performing independent monitoring. 29 Inexperienced PNF not monitoring PF AL35B4124 Given an FTTC, PNF fails to detect it due to looking out for the terrain and hence not performing independent monitoring. 30 Inexperienced PNF not monitoring PF AL35B4124 Given an FTTC, PNF fails to detect it due to looking out for the terrain and hence not performing independent monitoring. 30 Inexperienced PNF not monitoring PF AL35B4124 Given an FTTC, PNF fails to detect it due to looking out for the terrain and hence not performing independent monitoring. 48; 50; 51; 52					1		
terrain terrain terrain terrain sp; 60; 61; 62; 11 Flight crew CRM failure 21 Lack of fitness of PNF AL35B4111 Given a flight towards terrain being commanded (FTTC), pilot not flying (PNF) fails to detect it due to lack of fitness (e.g. fatigue). 23; 24; 25 35; 36; 37; 38; 39; 55; 65; 75, 75, 75; 65; 67; 78; 61; 62; 63 22 Distraction of PNF by unplanned events AL35B4112 Given an FTTC, PNF fails to detect it due to distraction by unplanned events (e.g. unrelated warning messages). 23; 24; 25 35; 36; 37; 38; 39; 48; 50; 51; 52; 63 23 Absorption of PNF in routine tasks AL35B4113 Given an FTTC, PNF fails to detect it due to being absorbed in routine duties (e.g. radio communication). 23; 24; 25 35; 36; 37; 38; 39; 48; 50; 51; 52; 63 24 PF under instruction by PNF AL35B4121 Given an FTTC, PNF fails to detect it due to being directly instructed by the pilot flying (PF), and hence not performing independent monitoring. 23; 24; 25 35; 36; 37; 38; 39; 39; 35; 56; 57; 58; 61; 62; 63 25 Flight crew jointly operating FMS AL35B4122 Given an FTTC, PNF fails to detect it due to jointly programming the flight through the PNF and hence not performing independent monitoring. 23; 24; 25 35; 36; 37; 38; 39; 39; 35; 56; 57; 58; 61; 62; 63 26 PNF looking for terrain AL35B4123 Given an FTTC, PNF fails to detect it due to looking out for the terrain, and hence not performing independent monitoring. 23; 24; 25 35; 36; 37; 38; 39; 39; 36; 37; 38; 39; 39; 36; 37; 38; 39; 39; 36; 37; 38; 39; 39; 39; 30; 30; 30; 30; 30; 30; 30; 30; 30; 30	20 Incorrect trajectory conflicts with	AL35F73			15; 16; 17; 20; 23;	26; 36; 37; 38; 39;	48; 50; 51; 54; 55; 5
Flight crew CRM failure AL35B4112 Given a flight towards terrain being commanded (FTTC), pilot not flying (PNF) fails to detect it due to lack of fitness (e.g. fatigue). Signature (FMS) with the PF, and hence not performing independent monitoring. Signature (FMS) with the PF, and hence ont performing independent monitoring. Signature (FMS) with the PF, and hence ont performing independent monitoring. Signature (FMS) with the preforming independent monitoring. Signature (FMS) with the more experienced PNF not monitoring PF AL35B4124 Given an FTTC, PNF fails to detect it due to being inexperienced and 3; not performing independent monitoring of the more experienced Signature (FMS) with more experienced Signature (FMS) with more experienced Signature (FMS) with more experienced Signature (FMS) signature (FMS) with more experienced Signature (FMS) signatur					<u> </u>		59; 60; 61; 62; 63
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unplanned events (e.g. unrelated warning messages). 23; 24; 25 35; 36; 37; 38; 39; 55; 56; 75, 75, 86; 61; 62; 63 24 Absorption of PNF in routine tasks 25; 42, 25 26; 27; 31; 32; 33; 34; 48; 50; 51; 52; 56; 57, 58; 61; 62; 63 26; 42 PF under instruction by PNF 26; 43; 42; 55 27; 44; 55 28; 42; 55 28; 42; 55 28; 43; 42; 55 38; 36; 37; 38; 39; 55; 56; 75, 75, 75; 75; 75; 75; 75; 75; 75; 75; 75; 75;			<u> </u>				
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23 Absorption of PNF in routine tasks AL35B4113 Given an FTTC, PNF fails to detect it due to being absorbed in routine duties (e.g. radio communication). 24 PF under instruction by PNF AL35B4121 Given an FTTC, PNF fails to detect it due to being directly instructed 3; by the pilot flying (PF), and hence not performing independent monitoring. 25 Flight crew jointly operating FMS AL35B4122 Given an FTTC, PNF fails to detect it due to jointly programming the performing independent monitoring. 26 PNF looking for terrain AL35B4123 Given an FTTC, PNF fails to detect it due to looking out for the terrain, and hence not performing independent monitoring. 27 Inexperienced PNF not monitoring PF AL35B4124 Given an FTTC, PNF fails to detect it due to being directly instructed 3; by the pilot flying (PF), and hence not performing independent monitoring. 37			unplanned events (e.g. unrelated warning messages).		23; 24; 25	35; 36; 37; 38; 39;	55; 56; 57; 58; 59; 6
routine duties (e.g. radio communication). 23; 24; 25 35; 36; 37; 38; 39; 55; 56; 57; 58; 61; 62; 63 24 PF under instruction by PNF AL35B4121 Given an FTTC, PNF fails to detect it due to being directly instructed 3; by the pilot flying (PF), and hence not performing independent monitoring. Given an FTTC, PNF fails to detect it due to jointly programming the flight management system (FMS) with the PF, and hence not performing independent monitoring. AL35B4122 Given an FTTC, PNF fails to detect it due to jointly programming the flight management system (FMS) with the PF, and hence not performing independent monitoring. Comparison of the interval of the	22 Absorption of DAIR in the control of the control	AL2504412	Chron on ETTC DNE faile to detect it does to it.	2.	15, 16, 17, 10, 22, 21	26, 27, 24, 22, 22, 2	
24 PF under instruction by PNF AL35B4121 Given an FTTC, PNF fails to detect it due to being directly instructed 3; 15; 16; 17; 18; 20; 21; 26; 27; 31; 32; 33; 34; 48; 50; 51; 52; 52; 54; 55; 56; 57; 58; 53; 36; 37; 38; 39; 55;	25 Absorption of PNF in routine tasks	AL35B4113		3;			
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by the pilot flying (PF), and hence not performing independent monitoring. 23; 24; 25 35; 36; 37; 38; 39; 55; 56; 57; 58; 58; 57; 58; 58; 57; 58; 58; 57; 58; 58; 57; 58; 58; 57; 58; 58; 58; 58; 58; 58; 58; 58; 58; 58	24 PF under instruction by PNF	ΔΙ 35Β/121	Given an ETTC PNE fails to detect it due to being directly instructed	3.	15: 16: 17: 18: 20: 21:	26- 27- 31- 22- 22- 24-	
Example Comparison Compar	2711 under instruction by PNF	AL3304121		3,			
25 Flight crew jointly operating FMS AL35B4122 Given an FTTC, PNF fails to detect it due to jointly programming the flight management system (FMS) with the PF, and hence not performing independent monitoring. 26 PNF looking for terrain AL35B4123 Given an FTTC, PNF fails to detect it due to looking out for the terrain, and hence not performing independent monitoring. 27 Inexperienced PNF not monitoring PF AL35B4124 Given an FTTC, PNF fails to detect it due to being inexperienced and 3; not performing independent monitoring of the more experienced 37 Inexperienced PNF not monitoring PF AL35B4124 Given an FTTC, PNF fails to detect it due to being inexperienced and 3; not performing independent monitoring of the more experienced 38 Inexperienced PNF not monitoring PF AL35B4124 Given an FTTC, PNF fails to detect it due to being inexperienced and 3; not performing independent monitoring of the more experienced 39 Inexperienced PNF not monitoring PF AL35B4124 Given an FTTC, PNF fails to detect it due to being inexperienced and 3; not performing independent monitoring of the more experienced 30 Inexperienced PNF not monitoring PF AL35B4124 Given an FTTC, PNF fails to detect it due to being inexperienced and 3; not performing independent monitoring of the more experienced 31 Inexperienced PNF not monitoring PF AL35B4124 Given an FTTC, PNF fails to detect it due to being inexperienced and 3; not performing independent monitoring of the more experienced PNF not monitoring PF AL35B4124 Given an FTTC, PNF fails to detect it due to being inexperienced and 3; not performing independent monitoring PF AL35B4124 Given an FTTC, PNF fails to detect it due to being inexperienced and 3; not performing independent monitoring PF AL35B4124 Given an FTTC, PNF fails to detect it due to being inexperienced and 3; not performing independent monitoring PF AL35B4124 Given an FTTC, PNF fails to detect it due to being inexperienced and 3; not performing independent monitoring PF AL35B4124 Given an FTTC, PNF fails to detect it due to bei					23, 24, 23	33, 30, 31, 36, 38,	
Fight management system (FMS) with the PF, and hence not performing independent monitoring. 23; 24; 25 35; 36; 37; 38; 39; 55; 56; 57; 58; 58; 58; 58; 58; 59; 59; 59; 59; 59; 59; 59; 59; 59; 59	25 Flight crew jointly operating EMS	AL35R4122		3:	15: 16: 17: 18: 20: 21:	26: 27: 31: 32: 33: 34:	
Prioring independent monitoring. Size of the performing independent monitoring.				<u>-</u> ′			55; 56; 57; 58; 59; 6
26 PNF looking for terrain AL35B4123 Given an FTTC, PNF fails to detect it due to looking out for the terrain, and hence not performing independent monitoring. 3; 15; 16; 17; 18; 20; 21; 26; 27; 31; 32; 33; 34; 48; 50; 51; 52; 23; 24; 25 35; 36; 37; 38; 39; 55; 56; 75; 88; 61; 62; 63 27 Inexperienced PNF not monitoring PF AL35B4124 Given an FTTC, PNF fails to detect it due to being inexperienced and 3; 15; 16; 17; 18; 20; 21; 26; 27; 31; 32; 33; 34; 48; 50; 51; 52; 62; 63 28; 59; 50; 50; 50; 50; 50; 50; 50; 50; 50; 50					,,	22, 30, 31, 30, 33,	
terrain, and hence not performing independent monitoring. 23; 24; 25 35; 36; 37; 38; 39; 55; 56; 57; 58; 61; 62; 63 27 Inexperienced PNF not monitoring PF AL35B4124 Given an FTTC, PNF fails to detect it due to being inexperienced and 3; 15; 16; 17; 18; 20; 21; 26; 27; 31; 32; 33; 34; 48; 50; 51; 52; 55; 65; 75; 58; 75; 75; 75; 75; 75; 75; 75; 75; 75; 75	26 PNF looking for terrain	AL35B4123		3;	15; 16; 17; 18: 20: 21:	26; 27; 31; 32: 33: 34:	48; 50; 51; 52; 53; 5
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27 Inexperienced PNF not monitoring PF AL35B4124 Given an FTTC, PNF fails to detect it due to being inexperienced and 3; 15; 16; 17; 18; 20; 21; 26; 27; 31; 32; 33; 34; 48; 50; 51; 52; not performing independent monitoring of the more experienced 23; 24; 25 35; 36; 37; 38; 39; 55; 56; 57; 58;					<u> </u>	<u> </u>	
	27 Inexperienced PNF not monitoring PF	AL35B4124	Given an FTTC, PNF fails to detect it due to being inexperienced and	3;	15; 16; 17; 18; 20; 21;	26; 27; 31; 32; 33; 34;	48; 50; 51; 52; 53; 5
			not performing independent monitoring of the more experienced		23; 24; 25	35; 36; 37; 38; 39;	55; 56; 57; 58; 59; 6
[02, 02, 03			PF.		<u> </u>		61; 62; 63



	Base events	Code	Definition	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
28	Failure of on-board monitoring	AL35B42	Given an FTTC, PNF performs independent monitoring, but fails to	3;	15; 16; 17; 18; 20; 21;	26; 27; 31; 32; 33; 34;	48; 50; 51; 52; 53
			recognise the trajectory command is incorrect.		23; 24; 25	35; 36; 37; 38; 39;	55; 56; 57; 58; 5 61; 62; 63
9	PNF subordinate and silent	AL35B431	Given an FTTC, the PNF suspects the error, but fails to communicate	3:	15; 16; 17; 18; 20; 21;	26; 27; 31; 32; 33; 34;	48; 50; 51; 52; 5
			this to PF due to being subordinate and feeling unable to express	-/	23: 24: 25	35; 36; 37; 38; 39;	55; 56; 57; 58; 5
1			concerns to the PF.		25, 21, 25	33, 30, 37, 30, 33,	61; 62; 63
	DNF	AL35B432		2.	45, 46, 47, 40, 20, 24,	26, 27, 24, 22, 22, 24,	
U	PNF superior and silent	AL35B432	Given an FTTC, the PNF recognises the error, but fails to	3;	15; 16; 17; 18; 20; 21;	26; 27; 31; 32; 33; 34;	48; 50; 51; 52; 5
1			communicate this in order to test or train the PF.		23; 24; 25	35; 36; 37; 38; 39;	55; 56; 57; 58; 5
╛							61; 62; 63
1	Press-on-itis	AL35B441	Given an FTTC, PNF expresses concerns about the trajectory	3;	15; 16; 17; 18; 20; 21;	26; 27; 31; 32; 33; 34;	48; 50; 51; 52; 5
1			command but the pilot continues without correcting it		23; 24; 25	35; 36; 37; 38; 39;	55; 56; 57; 58; 5
1					1 7 7	,,.,.,.,	61; 62; 63
2	ATC disregard flight crew concerns	AL35B442	Given an FTTC, flight crew express concerns about the trajectory	3;	15; 16; 17; 18; 20; 21;	26; 27; 31; 32; 33; 34;	48; 50; 51; 52; 5
'-	ATC disregard night crew concerns	ALSSBAAZ	command but the controller confirms it and the flight crew execute	٥,	23; 24; 25	35; 36; 37; 38; 39;	55; 56; 57; 58; 5
1			command but the controller commissit and the night crew execute		23, 24, 23	33, 30, 37, 36, 39,	
4			it				61; 62; 63
_	Flight crew loss of situation awareness						
3	Imminent CFIT above decision height	AL35C2	An imminent CFIT occurs when aircraft is above the decision height	3;	15; 16; 17; 18; 20; 21;	26; 27; 31; 32; 33; 34;	48; 50; 51; 52; 5
	(DH)				23; 24; 25	35; 36; 37; 38; 39;	55; 56; 57; 58; 5
1							61; 62; 63
4	Low visibility over terrain	AL35B2111	Given an imminent CFIT above decision height (DH), the terrain	3;	15; 16; 17; 18; 20; 21;	26; 27; 31; 32; 33; 34;	48; 50; 51; 52; 5
1	2011 VISIONICY OVER CETTON		ahead is in effect invisible due to cloud, fog etc	٥,	23; 24; 25	35; 36; 37; 38; 39;	55; 56; 57; 58; 5
1			allead is in effect invisible due to cloud, log etc		23, 24, 23	33, 30, 37, 36, 39,	
4							61; 62; 63
35	Dark terrain	AL35B2112	Given an imminent CFIT above DH, the terrain ahead is in effect	3;	15; 16; 17; 18; 20; 21;	26; 27; 31; 32; 33; 34;	48; 50; 51; 52; 5
1			invisible due to darkness combined with lack of illumination on the		23; 24; 25	35; 36; 37; 38; 39;	55; 56; 57; 58; 5
1			terrain.				61; 62; 63
6	Flight crew fail to see visible terrain	AL35B212	Given an imminent CFIT above DH with visible terrain ahead, flight	3:	15; 16; 17; 18; 20; 21;	26; 27; 31; 32; 33; 34;	48; 50; 51; 52; 5
			crew fail to see the terrain in time to avoid an imminent CFIT.	-,	23; 24; 25	35; 36; 37; 38; 39;	55; 56; 57; 58; 5
1			crew fail to see the terrain in time to avoid an infilliment crif.		23, 24, 23	33, 30, 37, 38, 33,	
4							61; 62; 63
- 1	Unsuccessful avoidance of observed	AL35B213	Given an imminent CFIT above DH, the flight crew see the terrain	3;	15; 16; 17; 18; 20; 21;	26; 27; 31; 32; 33; 34;	48; 50; 51; 52; 5
1	terrain		ahead but fail to avoid an imminent CFIT.		23; 24; 25	35; 36; 37; 38; 39;	55; 56; 57; 58; 5
							61; 62; 63
88	Imminent CFIT at decision height	AL35C3	An imminent CFIT occurs when aircraft is at decision height	3;	15; 16; 17; 18; 20; 21;	26; 27; 31; 32; 33; 34;	48; 50; 51; 52; 5
- 1					23; 24; 25	35; 36; 37; 38; 39;	55; 56; 57; 58; 5
1					' ' '	,,.	61; 62; 63
0	Unsuccessful missed approach	AL35B22A	Given an imminent CFIT below DH, flight crew fail to avoid an	3;	15; 16; 17; 18; 20; 21;	26; 27; 31; 32; 33; 34;	48; 50; 51; 52; 5
	procedure	ALSSBEZA		3,	23; 24; 25		55; 56; 57; 58; 5
- 1	procedure		imminent CFIT by making a missed approach.		23; 24; 25	35; 36; 37; 38; 39;	
4							61; 62; 63
10	No terminal area radar (TAR) available	AL35B31	Given a Controlled Flight Towards Terrain (CFTT), the aircraft	3;	15; 16; 17; 18; 20; 21;	26; 27; 31; 32; 33; 34;	48; 50; 51; 52; 5
1			location is not covered by ATC with terminal area radar (TAR).		23; 24; 25	35; 36; 37; 38; 39;	55; 56; 57; 58; 5
1							61; 62; 63
1	Unsuccessful ATCO monitoring of TAR	AL35B321	Given a CFTT with TAR available, ATCO fails to detect in time to be	3;	15; 16; 17; 18; 20; 21;	26; 27; 31; 32; 33; 34;	48; 50; 51; 52; 5
-1	5 -	I	able to prevent an imminent CFIT.		23; 24; 25	35; 36; 37; 38; 39;	55; 56; 57; 58; 5
-1		I			,,	, -0, 5., 50, 55,	61; 62; 63
2	No MSAW available	AL35B3221	Given a CFTT with TAR available, minimum safe altitude warning	3;	15; 16; 17; 18; 20; 21;	26; 27; 31; 32; 33; 34;	48; 50; 51; 52; 5
-4	NO IVIDAVV dVdlldDIE	WE33D3221		٥,			
-1		I	(MSAW) is not available.		23; 24; 25	35; 36; 37; 38; 39;	55; 56; 57; 58; 5
4					1		61; 62; 63
3	MSAW failure to give warning in time	AL35B3222	Given a CFTT with TAR and MSAW available, MSAW does not give a	3;	15; 16; 17; 18; 20; 21;	26; 27; 31; 32; 33; 34;	48; 50; 51; 52; 5
-1		I	warning in time to be able to prevent an imminent CFIT.		23; 24; 25	35; 36; 37; 38; 39;	55; 56; 57; 58; 5
- [1					61; 62; 63
4	ATCO failure to respond to MSAW	AL35B3223	Given a CFTT with MSAW warning, ATCO does not respond in time	3;	15; 16; 17; 18; 20; 21;	26; 27; 31; 32; 33; 34;	48; 50; 51; 52; 5
	warning		to be able to prevent an imminent CFIT.	٥,	23; 24; 25	35; 36; 37; 38; 39;	55; 56; 57; 58; 5
-1	waiting	I	to be able to prevent an infillinent Crit.		23, 24, 23	33, 30; 37; 38; 39;	
4				_	+	 	61; 62; 63
5	ATCO failure to resolve conflict in time	AL35B33	Given a CFTT with ATCO alerted by an MSAW warning, ATCO and	3;	15; 16; 17; 18; 20; 21;	26; 27; 31; 32; 33; 34;	48; 50; 51; 52; 5
-1		I	flight crew do not correct trajectory in time to prevent an imminent		23; 24; 25	35; 36; 37; 38; 39;	55; 56; 57; 58; 5
-1		I	CFIT.				61; 62; 63
V	GPWS failure	ĺ					i e
	GPWS not installed	AL35B11	Given an imminent CFIT, the aircraft is not fitted with GPWS.	3;	15; 16; 17; 18; 20; 21;	26; 27; 31; 32; 33; 34;	48; 50; 51; 52; 5
'ا"	o matanea	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	over an immedia or it, the director is not need with Gr Ws.	٥,	23; 24; 25	35; 36; 37; 38; 39;	55; 56; 57; 58; 5
-1		I			25, 24; 25	33, 36; 37; 38; 39;	
4							61; 62; 63
7	No GPWS warning in time	AL35B12	Given an imminent CFIT on an aircraft fitted with GPWS, the GPWS	3;	15; 16; 17; 18; 20; 21;	26; 27; 31; 32; 33; 34;	48; 50; 51; 52; 5
- 1		I	does not give an appropriate warning in time for avoidance action.	1	23; 24; 25	35; 36; 37; 38; 39;	55; 56; 57; 58; 5
- 1							



	Base events	Code	Definition	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
ESD 32	Incorrect presence of aircraft/vehicle	Code	Definition	Technology	Human	Organisation	System of
1	on runway in use Take-off instruction error by ATCO	TO32B611	ATCO gives inadequate take-off instructions to pilot, resulting in		11; 19; 22;	43; 44	Organisations 45; 50; 51; 52; 53; 56;
1	Take on instruction error by Areo	10325011	take-off while the runway is occupied		11, 13, 22,	73, 44	57; 58; 59; 60; 61; 62; 63
2	Inadequate communication with pilot	TO32B612	ATCO fails to communicate take-off instructions to pilot, resulting in take-off while the runway is occupied		11; 19; 22;	43; 44	45; 50; 51; 52; 53; 56; 57; 58; 59; 60; 61; 62; 63
3	Inadequate communication with pilot	TO32B412	ATCO fails to communicate the correct runway entry instructions and ensure correct read-back from the flight crew or vehicle driver, causing a runway incursion		11; 19; 22;	43; 44	45; 50; 51; 52; 53; 56; 57; 58; 59; 60; 61; 62; 63
4	Pilot failure to follow taxi route	TO32B421	Pilots or vehicle driver fail to follow the correct taxi route to the runway entry point, causing a runway incursion		11; 19; 22;	43; 44	45; 50; 51; 52; 53; 59; 60; 61; 62; 63
5	Pilot failure to follow runway entry	TO32B422	Pilots or vehicle driver fail to follow the runway entry instruction		11; 19; 22;	43; 44	45; 50; 51; 52; 53; 59;
6	instructions ATCO failure to recognise runway	TO32B41121	from ATCO, causing a runway incursion ATCO is not aware of a conflict on the runway and hence gives		11; 19; 22;	43; 44	60; 61; 62; 63 45; 50; 51; 52; 53; 56;
0	conflict	1032641121	runway entry instructions that cause a runway incursion		11, 19, 22,	45, 44	57; 59; 60; 61; 62; 63
7	ATCO misjudgement of runway separation	TO32B41122	ATCO is aware of a conflict but misjudges the runway separation and hence gives runway entry instructions that cause a runway incursion		11; 19; 22;	43; 44	45; 48; 50; 51; 52; 53; 54; 55; 56; 57; 59; 60; 61; 62; 63
8	Ground radar not present	TO32B411111	Ground radar is not installed at the airport or radar is not used by ATCO		11; 12; 19; 22;	43; 44	45; 46; 48; 50; 51; 52; 53; 56; 57; 59; 60; 61; 62; 63
9	Ground radar failure	TO32B411112	Ground radar fails to produce adequate position information on aircraft or vehicle		11; 12; 19; 22;	43; 44	45; 46; 48; 50; 51; 52; 53; 56; 57; 59; 60; 61;
10	Ineffective ATCO use of ground radar	TO32B411113	ATCO makes inappropriate use of ground radar, resulting in inadequate position information		11; 12; 19; 22;	43; 44	62; 63 45; 46; 48; 50; 51; 52; 53; 56; 57; 59; 60; 61;
11	Flight crew lost on airport	TO32B4111211	Pilots or vehcile driver lose knowledge of aircraft position and hence fail to supply adequate position report to ATCO		11; 12; 19; 22;	43; 44	62; 63 45; 46; 48; 50; 51; 52; 53; 56; 57; 59; 60; 61;
12	ATCO failure to clarify position reports	TO32B4111212	ATCO fails to clarify the incorrect position report by pilots or vehicle		11; 12; 19; 22;	43; 44	62; 63 45; 46; 48; 50; 51; 52;
	,, ,		driver			·	53; 56; 57; 59; 60; 61; 62; 63
13	Inadequate airport ATCO coordination	TO32B411122	Airport ATCO fails to communicate adequately with approach/ ground controller		11; 12; 19; 22; 23;	43; 44	45; 46; 47; 50; 51; 56; 57; 58; 59; 60; 61; 62; 63
14	Runway crossing movement	TO32B51	Aircraft or vehicle crosses runways to reach the terminal or another departure runway		11; 19; 22;	43; 44	45; 48; 50; 51; 52; 53; 59; 60; 61; 62; 63
15	Runway entry at intermediate location	TO32B52	Aircraft enters runway at intermediate location, which introduces the possibility of incursion ahead of other traffic		11; 19; 22;	43; 44	45; 48; 50; 51; 52; 53; 59; 60; 61; 62; 63
16	Alternating take-off and landing	TO32B53	Runway used for alternating take-offs and landings		11; 19;	43; 44	45; 50; 51; 56; 57; 59; 60; 62; 63
17	Incorrect runway entry point	TO32B54	Aircraft enters the end of a wrong runway, or enters runway unintendedly through an intermediate taxiway or intersection		11; 19; 22;	43; 44	45; 48; 50; 51; 52; 53; 56; 57; 59; 60; 61; 62; 63
18	Pilot failure to follow take-off instructions	TO32B62	Pilots fail to follow the take-off instruction from the ATCO, resulting in take-off while the runway is occupied		11; 19; 22;	43; 44	45; 50; 51; 52; 53; 58; 59; 60; 61; 62; 63
19	RIMCAS not present	TO32B21	Runway Conflict Warning system is not installed or not in operation at the time		11; 12; 19; 22; 23;	43; 44	45; 46; 47; 48; 50; 51; 52; 53; 54; 55; 56; 57;
20	RIMCAS failure to give warning in time	TO32B22	Runway Conflict Warning system fails to alert ATCO in time of a conflict		11; 12; 19; 22; 23;	43; 44	58; 59; 60; 61; 62; 63 45; 46; 47; 48; 50; 51; 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
21	Controller failure to respond to RIMCAS warning	TO32B23	ATCO is alerted to the conflict but fails to give response to the warning		11; 12; 19; 22; 23;	43; 44	45; 46; 47; 48; 50; 51; 52; 53; 54; 55; 56; 57;
22	Controller failure to resolve conflict in time	TO32B24	ATCO is alerted of the conflict but fails to resolve the conflict in time		11; 12; 19; 22; 23;	43; 44	58; 59; 60; 61; 62; 63 45; 46; 47; 48; 50; 51; 52; 53; 54; 55; 56; 57;
	Low visibility prevents conflict detection	TO32B111	ATCO fails to detect a conflict and give warning due to low visibility		11; 12; 19; 22; 23;	43; 44	58; 59; 60; 61; 62; 63 45; 46; 47; 48; 50; 51; 52; 53; 54; 55; 56; 57;
24	Darkness prevents conflict detection	TO32B112	ATCO fails to detect a conflict and give warning due to darkness		11; 12; 19; 22; 23;	43; 44	58; 59; 60; 61; 62; 63 45; 46; 47; 48; 50; 51;
25	Restricted view from tower prevents	TO32B113	ATCO fails to detect a conflict and give warning due to the		11; 12; 19; 22; 23;	43; 44	52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63 45; 46; 47; 48; 50; 51;
26	conflict detection ATCO failure to see visible aircraft in	TO32B114	restricted view from tower ATCO fails to detect a conflict and give warning due to ATCO's		11; 12; 19; 22; 23;	43; 44	52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
	time		failure to see the aircraft			45, 44	45; 46; 47; 48; 50; 51; 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
27	ATCO failure to resolve conflict in time	TO32B115	ATCO fails to warn the flight crew and provide a resolution of the conflict in time		11; 12; 19; 22; 23;	43; 44	45; 46; 47; 48; 50; 51; 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
28	Aircraft using runway	TO32B3	Given a runway incursion, another aircraft is present on the runway, thus creating a conflict		11; 12; 19; 22; 23;	43; 44	45; 46; 47; 48; 50; 51; 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
29	Avoidance essential	TO32C3	Given ATC failure to resolve a conflict, action by the flight crew or vehicle driver is necessary to avoid a runway collision		11; 12; 19; 22; 23;	43; 44	45; 46; 47; 48; 50; 51; 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
30	Ineffective avoidance by intruding aircraft/vehicle	TO32B12	Flight crew from the intruding aircraft or driver of the intruding vehicle fails to avoid the collision		11; 12; 19; 22; 23;	43; 44	45; 46; 47; 48; 50; 51; 52; 53; 54; 55; 56; 57;
31	Ineffective avoidance by impeded aircraft	TO32B13	Flight crew from the impeded aircraft fails to avoid the collision		11; 12; 19; 22; 23;	43; 44	58; 59; 60; 61; 62; 63 45; 46; 47; 48; 50; 51; 52; 53; 54; 55; 56; 57;
ESU 36	Ground collision imminent	Code	Definition	Technology	Human	Organisation	58; 59; 60; 61; 62; 63 System of
-30 30	C. Cana Compon milliment	Couc	Schiller.	. camology	aman	- rgamsau011	Organisations



Base events	Code	Definition	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
1 Ground agent error in moving equipment	TO36F11111	Deviation from procedures in positioning or moving equipment (e.g. vehicle, steps, baggage loader etc) by ground agent		12; 19;	44	46; 48; 50; 51; 52; 54; 55; 58; 59; 60; 62; 63
2 Ground equipment fault	TO36F11112	Deviation from procedures in positioning or moving equipment (e.g. vehicle, steps, baggage loader etc) due to equipment fault		12; 19;	44	46; 50; 51; 59; 60; 62; 63
		(e.g. brake failure)				
3 Ground movement deviation conflicts with aircraft	TO36F1112	Deviation from procedures in positioning or moving equipment (e.g. vehicle, steps, baggage loader etc) causes imminent collision with aircraft		12; 19;	44	46; 48; 50; 51; 52 54; 55; 59; 60; 62
4 Flight crew braking error allows movement while parked	TO36F11211	Flight crew fail to set brakes or maintain idle thrust, resulting in movement of parked aircraft		12; 19;	44	46; 50; 51; 54; 55 59; 60; 61; 62; 63
5 Movement of other aircraft deviates from procedures	TO36F11212	Other aircraft being pushed back or taxied nearby deviates from the intended trajectory		12; 19;	44	46; 48; 50; 51; 52 54; 55; 58; 59; 60 62; 63
6 Aircraft deviation creates conflict	TO36F1122	Deviation from the intended trajectory by the aircraft causes imminent collision		12; 19;	44	46; 48; 50; 51; 59 61; 62; 63
7 Inadequate pushback clearance	TO36F1211	Inadequate pushback clearance by ATC, e.g. failure to give information on passing traffic		12; 19;	44	46; 50; 51; 52; 53 60; 61; 62; 63
8 Pushback equipment fault	TO36F1212	Deviation from intended pushback trajectory due to equipment fault (e.g. towbar failure)		12; 19;	44	46; 50; 51; 59; 60 62; 63
9 Ground crew error in pushback	TO36F1213	Deviation from intended pushback trajectory due to ground crew error		12; 19;	44	46; 50; 51; 59; 60 62; 63
O Ineffective ground crew - flight crew communication	TO36F1214	Deviation from intended pushback trajectory due to ineffective communication between ground crew and flight crew		12; 19;	44	46; 50; 51; 54; 55 59; 60; 61; 62; 63
1 Pushback deviation creates conflict	TO36F122	Deviation from the intended pushback trajectory causes imminent collision		12; 19;	44	46; 50; 51; 59; 60 62; 63
2 Inadequate ground movement clearance or communication	TO36F1311	Inadequate ground movement clearance or communication by ATC during taxi-out, e.g. failure to communicate the extent to which a clearance implies obstacle clearance		12; 19;	44	46; 50; 51; 52; 53 55; 56; 57; 58; 59 61; 62; 63
3 Ground crew error in marshalling off stand	TO36F1312	Deviation from intended taxi trajectory due to marshalling error		12; 19;	44	46; 50; 51; 52; 5 60; 62; 63
4 Flight crew misjudgement of separation in taxi	TO36F1313	Deviation from intended taxi-out trajectory due to flight crew misjudgement of separation		12; 19;	44	46; 48; 50; 51; 5 54; 55; 59; 60; 6 63
5 Movement of other aircraft deviates from procedures	TO36F1314	Deviation from intended taxi trajectory by another taxiing aircraft		12; 19;	44	46; 48; 50; 51; 5 59; 60; 61; 62; 6
6 Taxi-out deviation creates conflict with aircraft	TO36F132	Deviation from the intended taxi-out trajectory causes imminent collision		12; 19;	44	46; 48; 50; 51; 5 59; 60; 61; 62; 6
7 Inadequate ground movement clearance or communication	TO36F1411	Inadequate ground movement clearance or communication by ATC during taxi-in, e.g. clearance for taxiway unsuitable for aircraft		12; 19;	44	46; 48; 50; 51; 5 54; 55; 59; 60; 6
8 Inadequate stand allocation	TO36F1412	Allocation of wrong stand for aircraft			44	50; 51; 52; 53; 54 59; 60; 61; 62; 6
9 Aircraft fault causes deviation in taxi-in	TO36F14131	Deviation from intended taxi-in trajectory due to aircraft fault (e.g. brake failure)	5; 7; 9;	12; 19;	44	46; 50; 51; 54; 5 59; 60; 61; 62; 6
O Flight crew handling error in taxi-in	TO36F14132	Deviation from intended taxi-in trajectory due to flight crew handling error		12; 19;	44	46; 51; 54; 55; 5 60; 61; 62; 63
1 Flight crew violation of taxi procedures	TO36F14133	Deviation from intended taxi-in trajectory due to flight crew procedural violation		12; 19;	44	46; 51; 59; 60; 6 63
2 Ground crew error marshalling onto stand	TO36F14134	Deviation from intended taxi-in trajectory due to marshalling error		12; 19;	44	46; 48; 50; 51; 5 54; 55; 59; 60; 6 63
Ground agent error in moving equipment	TO36F14141	Deviation from intended taxi-in trajectory due to ground agent error in moving equipment		12; 19;	44	46; 48; 50; 51; 5 54; 55; 59; 60; 6 63
4 Ground equipment fault	TO36F14142	Deviation from intended taxi-in trajectory due to ground equipment fault		12; 19;	44	46; 50; 51; 59; 6 62; 63
5 Taxi-in deviation creates conflict	TO36F142	Deviation from the intended taxi-in trajectory causes imminent collision		12; 19;	44	46; 48; 50; 51; 5 61; 62; 63
6 Avoidance impracticable for flight crew	TO36B21	Conflict cannot be avoided by flight crew	5; 7; 9;	12; 19;	44	46; 48; 50; 51; 5 54; 55; 56; 57; 5 60; 61; 62; 63
7 Conflict virtually invisible from flight deck	TO36B22	Flight crew fail to avoid conflict because point of conflict (e.g. wing tip) cannot be seen from the flight deck	5; 7; 9;	12; 19;	44	46; 48; 50; 51; 5 54; 55; 56; 57; 5 60; 61; 62; 63
8 Flight crew misjudgement of clearance	TO36B23	Flight crew fail to avoid conflict because they misjudge the clearance	5; 7; 9;	12; 19;	44	46; 48; 50; 51; 5 54; 55; 56; 57; 5 60; 61; 62; 63
9 Flight crew slow response to conflict	TO36B24	Flight crew fail to avoid conflict because they respond too slowly when they become aware of the conflict	5; 7; 9;	12; 19;	44	46; 48; 50; 51; 5 54; 55; 56; 57; 5
0 Avoidance impracticable for ground crew	TO36B11	Conflict cannot be avoided by ground crew	5; 7; 9;	12; 19;	44	60; 61; 62; 63 46; 48; 50; 51; 5 54; 55; 56; 57; 5
1 Conflict virtually invisible from tug	TO36B12	Ground crew fail to avoid conflict because point of conflict (e.g. wing tip) cannot be seen from the tug	5; 7; 9;	12; 19;	44	60; 61; 62; 63 46; 48; 50; 51; 5 54; 55; 56; 57; 5
2 Inadequate monitoring by ground crew	TO36B13	Ground crew fail to avoid conflict because they are not monitoring the clearance	5; 7; 9;	12; 19;	44	60; 61; 62; 63 46; 48; 50; 51; 5 54; 55; 56; 57; 5
T. Control of the Con	1		1	1	1	60; 61; 62; 63



	Base events	Code	Definition	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	Base events	Code	Definition	Technology	Human	Organisation	System of
_	Incorrect configuration						Organisations
	Unsuccessful TO configuration checklist	TO05B111	Co-pilot fails to determine the position of the flap and slats required		13; 22;	38; 41;	50; 51; 54; 55; 58;
2	Unsuccessful Checklist Verification	TO05B112	for a successful take-off Captain fails to identify the incorrect position of the flap and slats		13; 22;	38; 41;	60; 61; 62; 63 50; 51; 54; 55; 58; 5
			determined by co-pilot				60; 61; 62; 63
	Flap & slat positions entered into FMC incorrectly	TO05B12	Co-pilot fails to enter the correct flap and slat settings into the FMC that the aircraft is incorrectly configured prior to push-back from		13; 22;	38; 41;	50; 51; 54; 55; 58; 5 60; 61; 62; 63
			the stand				
4	Verification not conducted	TO05B21	Captain fails to perform the take-off configuration check prior to the application of take-off power		13; 22;	38; 41;	50; 51; 54; 55; 58; 56; 60; 61; 62; 63
5	Verification unsuccessful	TO05B22	Captain performs the take-off configuration check but fails to notice		13; 22;	38; 41;	50; 51; 54; 55; 58;
П	Take-off configuration warning		that the aircraft is configured incorrectly.				60; 61; 62; 63
6	Unsuccessful Manufacture	TO05B311	TOCW system fails due to unsuccessful manufacture and hence the take-off is not rejected	3;	13; 22;	38; 41;	50; 51; 54; 55; 58; 60: 61: 62: 63
7	Unsuccessful Maintenance	TO05B312	TOCW system fails due to unsuccessful maintenance and hence the	3;	13; 22;	38; 41;	50; 51; 54; 55; 58;
	Unsuccessful Operation	TO05B313	take-off is not rejected TOCW system fails because the flight crew operate it incorrectly.		13; 22;	38; 41;	60; 61; 62; 63 50; 51; 54; 55; 58;
8	Unsuccessful Operation	10058313	This includes the failure of the flight crew to check that the TOCW is		13; 22;	38; 41;	60; 61; 62; 63
			working prior to taxi or the failure of the crew to reset the TOCW				
9	Unsuccessful Manufacture	TO05B321	circuit breaker following testing TOCW power supply fails due to unsuccessful manufacture and	2;	13; 22;	38; 41;	50; 51; 54; 55; 58;
10	Unsuccessful Maintenance	TO05B322	hence the take-off is not rejected TOCW power supply fails due to unsuccessful maintenance and	2;	13; 22;	38; 41;	60; 61; 62; 63 50; 51; 54; 55; 58;
10	Offsuccessful Maintenance	10036322	hence the take-off is not rejected	۷,	13, 22,	36, 41,	60; 61; 62; 63
	Aircraft takes-off with incorrect configuration	TO05B33	Aircraft is still able to take-off even with the incorrect configuration		13; 22;	38; 41;	50; 51; 54; 55; 58; 60; 61; 62; 63
	Flight crew rejects take-off						60, 61, 62, 63
12	Pilot Misdiagnosis	TO05B411	The pilot misdiagnoses the situation and misunderstands the warning and allows the aircraft to reach V1 before incorrectly		13; 22;	38; 41;	50; 51; 54; 55; 58; 60; 61; 62; 63
			aborting the take-off				
13	Pilot Misjudgement	TO05B412	The pilot diagnoses the TOCW but misjudges the situation and allows the aircraft to reach V1 before incorrectly aborting the take-		13; 22;	38; 41;	50; 51; 54; 55; 58; 60; 61; 62; 63
			off				
	Take-off rejected correctly when below V1	TO05B42	If the take-off is rejected when the aircraft is below V1 then this is a success, but it must be included to obtain the pivotal event		13; 22;	38; 41;	50; 51; 54; 55; 58; 60; 61; 62; 63
			probability.				00, 01, 02, 03
	Failure to achieve maximum braking Insufficient Runway Length	TO05B51	The runway is too short under wet or icy runway conditions for the		13; 22;	38; 41;	48; 50; 51; 54; 55
13	maunicient nunway tength	1003831	plane to come to a halt even if the take-off is aborted before V1 is		13, 22,	30, 41,	59; 60; 61; 62; 63
16	Brakes not functioning correctly	TO05B52	reached. Brakes are not giving maximum braking, e.g. because of improper	7; 9;	13; 22;	38; 41;	50; 51; 54; 55; 58
10	brakes not functioning correctly	1003632	maintenance and damages	7, 9,	13, 22,	36, 41,	60; 61; 62; 63
17	Brakes not applied correctly	TO05B53	Failure of the flight crew to apply all the braking systems immediately after take-off rejection.		13; 22;	28; 29; 30; 38; 41;	50; 51; 54; 55; 58 60; 61; 62; 63
٧	Aircraft stalls after rotation		ininediately after take-on rejection.				60, 61, 62, 63
17	Brakes not applied correctly	TO05B53	Failure of the flight crew to apply all the braking systems	2; 3;	13; 22;	38; 41;	50; 51; 54; 55; 58 60; 61; 62; 63
19	Pilot ignores stickshaker	TO05B622	immediately after take-off rejection. Flight crew take no action to the activated stick-shaker	2; 3;	13; 22;	38; 41;	50; 51; 54; 55; 58
20	Stick shaker failure	TO05B6211	Stick-shaker fails due to improper manufacture or maintenance	2; 3;	13; 22;	38; 41;	60; 61; 62; 63 50; 51; 54; 55; 58
					13, 22,	36, 41,	60; 61; 62; 63
21	Stall AOA too low	TO05B6212	Stall occurs at an AOA that is less than the AOA required to activate the stick-shaker	2; 3; 6;	13; 22;	38; 41;	48; 50; 51; 54; 55 59; 60; 61; 62; 63
	Flight crew fails to regain control						39, 00, 01, 02, 03
22	Uncontrollable	TO05B71	No input to controls will allow the flight crew to maintain control of the aircraft.	2; 3; 6;	13; 22;	38; 41;	48; 50; 51; 54; 55 59; 60; 61; 62; 63
23	Lack of control	TO05B72	The pilot makes no attempt to control the aircraft.	2; 3; 6;	13; 22;	38; 41;	48; 50; 51; 54; 55
2/1	Incorrect Control	TO05B73	The pilot applies incorrect control to the aircraft. This can be due to	2-2-6-	13; 22;	38; 41;	59; 60; 61; 62; 63 48; 50; 51; 54; 55
			improper training, stress and fatigue	2, 3, 0,	13, 22,		59; 60; 61; 62; 63
25	Insufficient control	TO05B74	The pilot applies correct measures but are not enough to prevent aircraft leaving off the side of the runway	2; 3; 6;	13; 22;	38; 41;	48; 50; 51; 54; 55 59; 60; 61; 62; 63
	Pre-Service De-icing Failure						
1	Icing conditions	TO06B11	Condition of weather being conductive to ice accumulation on aircraft		13;	41;	48; 50; 51; 54; 55 60; 61; 62; 63
2	Aircraft already in service	TO06B121	Aircraft is already in service and hence will not undergo a pre-		13;	41;	48; 50; 51; 54; 55
3	Aircraft entering service	TO06B1221	service de-icing procedure Aircraft entering service and hence undergo a pre-service de-icing		13;	41;	60; 61; 62; 63 48; 50; 51; 54; 55
٥	Aircraft entering service		procedure				60; 61; 62; 63
4	Pre-Service de-icing failure	TO06B1222	Pre-service de-icing procedures are unsuccessful due to incompletion or failure to check and verify that the treated surfaces		13;	41;	48; 50; 51; 54; 55 60; 61; 62; 63
			are free of contaminants or unwanted effects caused by de-icing				00, 01, 02, 03
- 11	Pre-flight De-icing Failure				1		
	Lack of pre-flight ice inspection	TO06B211	Flight crew fail to perform a visual and tactile inspection, due to the		13;	41;	48; 50; 51; 54; 55
			crew's belief that the conditions are not conductive to icing, lack of expectation		1		60; 61; 62; 63
6	Unsuccessful pre-flight ice inspection	TO06B212	Flight crew perform a pre-flight inspection but the inspection is		13;	41;	48; 50; 51; 54; 55;
-	Desiring Failure	TO06B22	inadequate and the contamination is not observed Aircraft is not de-iced properly following the detection of		13;	41;	60; 61; 62; 63
′	De-icing Failure		contamination pre-flight		13;		48; 50; 51; 54; 55 60; 61; 62; 63
8	ATC Delay	TO06B231	Aircraft is delayed by ATC such that ice re-accumulates		13;	41;	48; 50; 51; 54; 55
9	Holdover properties inadequate	TO06B232	Properties of the de-icing/ anti-icing fluid are inappropriate such		13;	41;	60; 61; 62; 63 48; 50; 51; 54; 55;
			that the Holdover time (HOT) is less than the time required to take- off				60; 61; 62; 63
					13;	41;	48; 50; 51; 54; 55;
10	Severe Weather	TO06B233	Weather is severe enough such that ice accumulates rapidly		13,	41,	40, 30, 31, 34, 33,



11	Lack of observation	TO06B311	Flight crew fail to perform a visual inspection from inside the aircraft		13;	41;	48; 50; 51; 54; 55; 5 60; 61; 62; 63
12	Unsuccessful Observation	TO06B312	Flight crew are unable to see the contamination because they fail to observe correctly, the flight is in darkness or the ice is not visible		13;	41;	48; 50; 51; 54; 55; 5 60; 61; 62; 63
13	De-icing Failure	TO06B32	Aircraft is not de-iced properly following the detection of		13;	41;	48; 50; 51; 54; 55; 5 60; 61; 62; 63
14	ATC Delay	TO06B331	contamination post push-back Aircraft is delayed by ATC such that ice re-accumulates		13;	41;	48; 50; 51; 54; 55; 5
15	Holdover properties inadequate	TO06B332	Properties of the de-icing/ anti icing fluid are inappropriate such		13;	41;	60; 61; 62; 63 48; 50; 51; 54; 55; 5
16	Severe Weather	TO06B333	that the HOT is less than the time required to take-off Weather is severe enough such that ice accumulates rapidly		13;	41;	60; 61; 62; 63 48; 50; 51; 54; 55; 5
	Aircraft stalls after rotation	10000000	following de-icing/ anti-icing		13,	12)	60; 61; 62; 63
	Stall Unavoidable	TO06B41	No input to controls will allow the flight crew to avoid the stall		13;	41;	48; 50; 51; 54; 55; 5
18	Stick-Shaker failure	TO06B4211	Stick-shaker fails due to improper manufacture or maintenance		13;	41;	60; 61; 62; 63 48; 50; 51; 54; 55; 5
19	Stall AOA too low	TO06B4212	Stall occurs at an AOA that is less than the AOA required to activate		13;	41;	60; 61; 62; 63 48; 50; 51; 54; 55;
20	Pilot ignores stickshaker	TO06B422	the stick-shaker Flight crew take no action to the activated stick-shaker		13;	41;	60; 61; 62; 63 48; 50; 51; 54; 55;
	Flight crew fails to detect windshear				,	ŕ	60; 61; 62; 63
	LLWAS not installed	TO08B111	A low-level windshear alert system is not installed at the departure		22;	36; 37; 39;	48; 50; 51; 54; 55;
2	LLWAS not actiavted	TO08B112	airport, given that a windshear encounter occurs The LLWAS fails to activate, e.g. due to inadequacies in the		22;	36; 37; 39;	59; 60; 61; 62; 48; 50; 51; 54; 55;
			software used by the system to predict windshear or a failure of the system as a whole				59; 60; 61; 62;
3	Failure of ATC to advise pilot	TO08B113	ATC fails to advise the flight crew that there is a windshear		22;	36; 37; 39;	48; 50; 51; 54; 55; 59; 60; 61; 62;
4	PWS not installed	TO08B121	Aircraft does not have a predictive windshear system (PWS)		22;	36; 37; 39;	48; 50; 51; 54; 55;
5	PWS not activated	TO08B122	installed PWS fails to activate, e.g. due to inadequacies in the software used		22;	36; 37; 39;	59; 60; 61; 62; 48; 50; 51; 54; 55;
			by the system to predict windshear or a failure of the system as a whole				59; 60; 61; 62;
6	Crew fail to recognise windshear	TO08B13	Flight crew fail to recognise the symptoms of windshear and hence the windshear is not detected when there is no ground or airborne warning		22;	36; 37; 39;	48; 50; 51; 54; 55; 59; 60; 61; 62;
П	Flight crew fails to perform windshear		warning				
7	escape manoeuvre Failure to avoid windshear	TO08B21	Windshear is detected by any of the systems available but the		22;	36; 37; 39;	48; 50; 51; 54; 55;
8	Aircraft too low	TO08B221	aircraft cannot avoid the windshear Aircraft is too close to the ground immediately after take-off and		22;	36; 37; 39;	59; 60; 61; 62; 48; 50; 51; 54; 55;
			the windshear encountered is such that is impossible to successfully perform and execute a windshear escape manoeuvre				59; 60; 61; 62;
9	Pilot fails to execute a WEM	TO08B222	Following detection, the flight crew fails to execute and complete a successful windshear escape manoeuvre (WEM)		22;	36; 37; 39;	48; 50; 51; 54; 55; 59; 60; 61; 62;
	Flight crew fails to maintain control	T000004				25.27.20	
	Uncontrollable	TO08B31	No input to controls will allow the flight crew to maintain control of the aircraft.		22;	36; 37; 39;	48; 50; 51; 54; 55; 5 59; 60; 61; 62;
11	Lack of control	TO08B32	The pilot makes no attempt to control the aircraft.		22;	36; 37; 39;	48; 50; 51; 54; 55; 5 59; 60; 61; 62;
12	Incorrect control	TO08B33	The pilot applies incorrect control to the aircraft. This can be due to improper training, stress and fatigue		22;	36; 37; 39;	48; 50; 51; 54; 55; 5 59; 60; 61; 62;
13	Insufficient control	TO08B34	The pilot applies correct measures but are not enough to prevent aircraft leaving off the side of the runway		22;	36; 37; 39;	48; 50; 51; 54; 55; ! 59; 60; 61; 62;
	Fire on-board aircraft	ER11B11		9;			
	Cargo in Hightened Flammable State		The cargo on board has an increased likelihood of combusting, which can be caused by incorrect stowage or incorrect containment in the case of flammable cargo				50; 51; 54; 55; 58; 60; 61; 62; 63
2	Foreign Object Damage results in fuel leak	ER11B1211	Foreign objects strike aircraft and cause damage that leads to fuel leak	4;	11; 15; 16; 18; 19; 20; 21; 22;	31; 32; 33; 34; 35; 36; 37; 38; 39; 43; 44	45; 50; 51; 52; 53; 55; 58; 59; 60; 61; 63
3	Unsuccessful Maintenance Revealed	ER11B1212	A leak of fuel from the fuel system, due to previous unsuccessful maintenance	4;			50; 51; 55; 56; 59; 61; 62; 63
4	Unsuccessful Fuel Transfer	ER11B1213	A fault or error during fuel transfer prior to the flight that, when ignited, results in a fire in flight	4;			50; 51; 55; 56; 59; 61; 62; 63
5	Flammable Vapour in Fuel Tank	ER11B122	Excessive flammable vapour within in the fuel tank that, when	4;			50; 51; 55; 56; 59;
-	Hydraulic Fluids in Hightened	ER11B13	ignited, results in an explosion within the tank A leak of hydraulic fluid that, when ignited, results in a fire in flight	5;			61; 62; 63 50; 51; 55; 56; 59;
							61; 62; 63 50; 51; 55; 56; 59; 6
6	Flammable State Aircraft Equipment in Hightened	ER11B14	Components parts of aircraft that are unusually vulnerable to fire,	2; 7;			
6		ER11B14	Components parts of aircraft that are unusually vulnerable to fire, e.g. incorrectly inflated tyres, incorrectly installed wiring, inadequately specified insulation.	2; 7;			61; 62; 63
7	Aircraft Equipment in Hightened	ER11B14 ER11B15	e.g. incorrectly inflated tyres, incorrectly installed wiring,	2; 7; 9;			50; 51; 55; 56; 59; 6
7	Aircraft Equipment in Hightened Flammable State		e.g. incorrectly inflated tyres, incorrectly installed wiring, inadequately specified insulation.				50; 51; 55; 56; 59; 6 61; 62; 63 50; 51; 55; 56; 59; 6
6 7 8	Aircraft Equipment in Hightened Flammable State Engine Overheats	ER11B15	e.g. incorrectly inflated tyres, incorrectly installed wiring, inadequately specified insulation. Any part of the engine overheats, causing a fire	9;			50; 51; 55; 56; 59; 6 61; 62; 63 50; 51; 55; 56; 59; 6 61; 62; 63 50; 51; 55; 56; 59; 6
6 7 8 9	Aircraft Equipment in Hightened Flammable State Engine Overheats APU Overheats	ER11B15 ER11B16	e.g. incorrectly inflated tyres, incorrectly installed wiring, inadequately specified insulation. Any part of the engine overheats, causing a fire The auxiliary power unit (APU) overheats, causing a fire	9; 9;			50; 51; 55; 56; 59; 61; 62; 63 50; 51; 55; 56; 59; 61; 62; 63
6 7 8 9 10	Aircraft Equipment in Hightened Flammable State Engine Overheats APU Overheats Electrical Event results in Ignition Excessive Heat Transfer results in Ignition	ER11B15 ER11B16 ER11B21	e.g. incorrectly inflated tyres, incorrectly installed wiring, inadequately specified insulation. Any part of the engine overheats, causing a fire The auxiliary power unit (APU) overheats, causing a fire ignition is caused by an electrical fault	9; 9;			50; 51; 55; 56; 59; 61; 62; 63 50; 51; 55; 56; 59; 61; 62; 63 50; 51; 55; 56; 59; 61; 62; 63
6 7 8 9 10 111 III	Aircraft Equipment in Hightened Flammable State Engine Overheats APU Overheats Electrical Event results in Ignition Excessive Heat Transfer results in	ER11B15 ER11B16 ER11B21	e.g. incorrectly inflated tyres, incorrectly installed wiring, inadequately specified insulation. Any part of the engine overheats, causing a fire The auxiliary power unit (APU) overheats, causing a fire ignition is caused by an electrical fault	9; 9;	11; 15; 16; 18; 19; 20; 21; 22;	31; 32; 33; 34; 35; 36; 37; 38; 39; 43; 44	50; 51; 55; 56; 59; 61; 62; 63 50; 51; 55; 56; 59; 61; 62; 63 50; 51; 55; 56; 59; 61; 62; 63 50; 51; 55; 56; 59; 61; 62; 63 50; 51; 55; 56; 59; 61; 62; 63 45; 50; 51; 52; 53; 55; 56; 59; 61; 62; 63
6 7 8 9 10 11 III II 12	Aircraft Equipment in Hightened Flammable State Engine Overheats APU Overheats Electrical Event results in Ignition Excessive Heat Transfer results in Ignition Flight crew fails to detect smoke/fire	ER11B15 ER11B16 ER11B21 ER11B22	e.g. incorrectly inflated tyres, incorrectly installed wiring, inadequately specified insulation. Any part of the engine overheats, causing a fire The auxiliary power unit (APU) overheats, causing a fire ignition is caused by an electrical fault ignition is caused by heating of flammable materials Failure in the on-board fire detection system, thus preventing the	9; 9; 2;	21; 22;		50; 51; 55; 56; 59; 61; 62; 63 50; 51; 55; 56; 59; 61; 62; 63 50; 51; 55; 56; 59; 61; 62; 63 50; 51; 55; 56; 59; 61; 62; 63 50; 51; 55; 56; 59; 61; 62; 63 45; 50; 51; 52; 53; 55; 56; 58; 59; 60; 62; 63 45; 50; 51; 52; 53; 55; 56; 58; 59; 60; 62; 63
6 7 8 9 10 11 III 12 13	Aircraft Equipment in Hightened Flammable State Engine Overheats APU Overheats Electrical Event results in Ignition Excessive Heat Transfer results in Ignition Flight crew fails to detect smoke/fire Fire Detection System Failure	ER11B15 ER11B16 ER11B21 ER11B22 ER11B31	e.g. incorrectly inflated tyres, incorrectly installed wiring, inadequately specified insulation. Any part of the engine overheats, causing a fire The auxiliary power unit (APU) overheats, causing a fire ignition is caused by an electrical fault ignition is caused by heating of flammable materials Failure in the on-board fire detection system, thus preventing the flight crew extinguishing the fire in time to prevent propagation failure in the on-board fire warning system, thus preventing the	9; 9; 2; 2; 4; 5; 7; 9; 2; 3; 4; 5; 7; 9;	21; 22; 11; 15; 16; 18; 19; 20; 21; 22;	37; 38; 39; 43; 44 31; 32; 33; 34; 35; 36;	50; 51; 55; 56; 59; 61; 62; 63 50; 51; 55; 56; 59; 61; 62; 63 50; 51; 55; 56; 59; 61; 62; 63 50; 51; 55; 56; 59; 61; 62; 63 45; 50; 51; 52; 53; 55; 56; 58; 59; 60; 62; 63 45; 50; 51; 52; 53;



			CATS ESD Base Events and 63 ASC	05 51 13			
16	No System Installed at Point of Fire	ER11B411	No fire extinguishing system is installed at the location of the fire	2; 3; 4; 5; 7; 9;	11; 15; 16; 18; 19; 20; 21; 22;	31; 32; 33; 34; 35; 36; 37; 38; 39; 43; 44	45; 50; 51; 52; 53; 54; 55; 56; 58; 59; 60; 61; 62; 63
17	Fire Extinction System Failure	ER11B412	A failure prevents operation of the fire extinguishing system	2; 3; 4; 5; 7; 9;	11; 15; 16; 18; 19; 20; 21; 22;	31; 32; 33; 34; 35; 36; 37; 38; 39; 43; 44	45; 50; 51; 52; 53; 54; 55; 56; 58; 59; 60; 61; 62; 63
18	Fire Extinction System not Activated	ER11B42	An operating fire extinction system is installed at the location of the fire, but the flight crew fails to activate the system	2; 3; 4; 5; 7; 9;	11; 15; 16; 18; 19; 20; 21; 22;	31; 32; 33; 34; 35; 36; 37; 38; 39; 43; 44	45; 50; 51; 52; 53; 54; 55; 56; 58; 59; 60; 61; 62; 63
19	Flight Crew misinterpret Systems Warning	ER11B431	Flight crew misdiagnose the cause of the fire warning, and hence delay the fire suppression	2; 3; 4; 5; 7; 9;	11; 15; 16; 18; 19; 20; 21; 22;	31; 32; 33; 34; 35; 36; 37; 38; 39; 43; 44	45; 50; 51; 52; 53; 54; 55; 56; 58; 59; 60; 61;
20	Flight Crew misinterpret Sensory Warnings	ER11B432	Flight crew attribute warning, e.g. burning smell, to an incorrect non-dangerous source	2; 3; 4; 5; 7; 9;	11; 15; 16; 18; 19; 20; 21; 22;	31; 32; 33; 34; 35; 36; 37; 38; 39; 43; 44	62; 63 45; 50; 51; 52; 53; 54 55; 56; 58; 59; 60; 61
21	Incorrect Operation of Fire Extinction System	ER11B44	Flight crew are aware of the fire but fail to operate the fire extinguishing system correctly and hence the fire is not	2; 3; 4; 5; 7; 9;	11; 15; 16; 18; 19; 20; 21; 22;	31; 32; 33; 34; 35; 36; 37; 38; 39; 43; 44	62; 63 45; 50; 51; 52; 53; 54 55; 56; 58; 59; 60; 61
22	Fire Extinction System Insufficient	ER11B45	extinguished Flight crew operate the fire extinguishing system correctly but the system is not sufficient to extinguish the fire	2; 3; 4; 5; 7; 9;	11; 15; 16; 18; 19; 20; 21; 22;	31; 32; 33; 34; 35; 36; 37; 38; 39; 43; 44	62; 63 45; 50; 51; 52; 53; 54 55; 56; 58; 59; 60; 61 62; 63
23	Fire Extinction Impractical	ER11B46	Once detected the fire propagates rapidly such that extinction is impractical	2; 3; 4; 5; 7; 9;	11; 15; 16; 18; 19; 20; 21; 22;	31; 32; 33; 34; 35; 36; 37; 38; 39; 43; 44	45; 50; 51; 52; 53; 54 55; 56; 58; 59; 60; 61 62; 63
	Fire propagates Fire fed by Original Flammable Source	ER11B51	The fire is not contained because it is fed by the continuing original source, e.g. fuel tank	2; 3; 4; 5; 7; 9;	11; 15; 16; 18; 19; 20; 21; 22;	31; 32; 33; 34; 35; 36; 37; 38; 39; 43; 44	45; 50; 51; 52; 53; 54 55; 56; 58; 59; 60; 61
25	Fire fed by Secondary Flammable Sources	ER11B52	The fire is not contained because it is fed by a source other than that which started it	2; 3; 4; 5; 7; 9;	11; 15; 16; 18; 19; 20; 21; 22;	31; 32; 33; 34; 35; 36; 37; 38; 39; 43; 44	62; 63 45; 50; 51; 52; 53; 54 55; 56; 58; 59; 60; 61 62; 63
26	Fire has Catastrophic Explosive Effects	ER11B53	The explosion is not contained by the surrounding structure	2; 3; 4; 5; 7; 9;	11; 15; 16; 18; 19; 20; 21; 22;	31; 32; 33; 34; 35; 36; 37; 38; 39; 43; 44	45; 50; 51; 52; 53; 54 55; 56; 58; 59; 60; 61 62; 63
	Flight crew fail to maintain control Flight Control Surfaces Inoperable	ER11B611	Flight control surfaces are inoperable, such that the flight crew cannot control the aircraft	2; 3; 4; 5; 7; 9;	11; 15; 16; 18; 19; 20; 21; 22;	31; 32; 33; 34; 35; 36; 37; 38; 39; 43; 44	45; 50; 51; 52; 53; 54 55; 56; 58; 59; 60; 61 62; 63
28	Aircraft Structural Integrity Failure	ER11B612	Parts of the aircraft detach so that it becomes uncontrollable	2; 3; 4; 5; 7; 9;	11; 15; 16; 18; 19; 20; 21; 22;	31; 32; 33; 34; 35; 36; 37; 38; 39; 43; 44	45; 50; 51; 52; 53; 54 55; 56; 58; 59; 60; 61 62; 63
29	Flight Crew Incapacitated	ER11B613	The flight crew are overcome by fire/smoke, so that they cannot control the aircraft	2; 3; 4; 5; 7; 9;	11; 15; 16; 18; 19; 20; 21; 22;	31; 32; 33; 34; 35; 36; 37; 38; 39; 43; 44	45; 50; 51; 52; 53; 54 55; 56; 58; 59; 60; 61 62; 63
6	Lack of Control	ER11B62	The pilot makes no attempt to control the aircraft after the fire propagates, e.g. due to distraction	2; 3; 4; 5; 7; 9;	11; 15; 16; 18; 19; 20; 21; 22;	31; 32; 33; 34; 35; 36; 37; 38; 39; 43; 44	45; 50; 51; 52; 53; 54 55; 56; 58; 59; 60; 63 62; 63
31	Incorrect Control	ER11B63	The pilot applies incorrect control to the aircraft after the fire propagates, e.g. due to improper training, stress and fatigue	2; 3; 4; 5; 7; 9;	11; 15; 16; 18; 19; 20; 21; 22;	31; 32; 33; 34; 35; 36; 37; 38; 39; 43; 44	45; 50; 51; 52; 53; 54 55; 56; 58; 59; 60; 61 62; 63
	Flight crew fails to maintain control ADI failure in flight	ER12B311	Attitude displayed by the attitude director indicator (ADI) is incorrect. This covers failures of the PF's ADI sufficient to induce spatial disorientation.	3;	13; 14;	41; 42;	50; 51; 54; 55; 58; 59 60; 61; 62; 63
10	No ADI cross-check by pilot	ER12B3121	Given failure of a single ADI in flight, that the PF does not detect the failure by cross-checking against other ADIs.		13; 14;	41; 42;	50; 51; 54; 55; 58; 59 60; 61; 62; 63
11	Multiple ADI failure	ER12B3122	Given failure of at least one ADI in flight, that the other ADIs also fail.	3;	13; 14;	41; 42;	50; 51; 54; 55; 58; 59 60; 61; 62; 63
12	Disorientating manoeuvre	ER12C1	Aircraft flies a manoeuvre involving combined changes in acceleration and bank/pitch angles, likely to induce spatial disorientation.		13; 14; 15; 16; 23;	36; 37; 38; 39; 41; 42;	48; 50; 51; 54; 55; 58 59; 60; 61; 62; 63
13	ADI not used by pilot	ER12B321	Given a disorientating manoeuvre, that the PF does not use the ADI to maintain spatial orientation.		13; 14;	41; 42;	50; 51; 54; 55; 58; 59 60; 61; 62; 63
14	Instrument meteorological conditions	ER12B41	Given an undiagnosed ADI failure or disorientating manoeuvre, that the aircraft is in cloud or fog.		13; 14;	41; 42;	50; 51; 54; 55; 58; 59 60; 61; 62; 63
15	Dark sky and terrain	ER12B42	Given an undiagnosed ADI failure or disorientating manoeuvre in visual meteorological conditions (VMC), that the aircraft is in darkness, with no moon, and no significant lights over the terrain.		13; 14;	41; 42;	50; 51; 54; 55; 58; 59 60; 61; 62; 63
16	Autopilot not capable of required manoeuvre	ER12B51	Given an undiagnosed ADI failure or disorientating manoeuvre, that the autopilot is not capable of performing the manoeuvre required at the time.		13; 14;	41; 42;	50; 51; 54; 55; 58; 59 60; 61; 62; 63
17	Flight crew training in manual flight	ER12B521	Given an undiagnosed ADI failure or disorientating manoeuvre, that the autopilot is not in use at the time in order to provide crew training in manual flight		13; 14;	41; 42;	50; 51; 54; 55; 58; 59 60; 61; 62; 63
	Flight crew preference for manual flight	ER12B522	Given an undiagnosed ADI failure or disorientating manoeuvre, that the autopilot is not in use at the time because the flight crew prefer manual flight		13; 14;	41; 42;	50; 51; 54; 55; 58; 59 60; 61; 62; 63
	·	ER12B523	Given an undiagnosed ADI failure or disorientating manoeuvre, that the autopilot is not in use at the time because the flight crew do not know how to use it for the required manoeuvre		13; 14;	41; 42;	50; 51; 54; 55; 58; 59 60; 61; 62; 63
	Autopilot incorrectly used by flight crew	ER12B53	Given an undiagnosed ADI failure or disorientating manoeuvre, that the flight crew are unsuccessfully trying to use the autopilot at the time.		13; 14;	41; 42;	50; 51; 54; 55; 58; 59 60; 61; 62; 63
	Flight crew member spatially disorientated						
1	Recovery impractical	ER12B11	Given an extreme attitude is executed, there is no practical recovery action possible.	3;	13; 14; 15; 16; 23;	36; 37; 38; 39; 41; 42;	48; 50; 51; 54; 55; 58 59; 60; 61; 62; 63
2	Lack of recovery action	ER12B12		3;	13; 14; 15; 16; 23;	36; 37; 38; 39; 41; 42;	48; 50; 51; 54; 55; 58 59; 60; 61; 62; 63
3	Incorrect recovery action	ER12B13	Given an extreme attitude where recovery is attempted, that the flight crew's attempted recovery is incorrect.	3;	13; 14; 15; 16; 23;	36; 37; 38; 39; 41; 42;	48; 50; 51; 54; 55; 58 59; 60; 61; 62; 63
4	Insufficient recovery action	ER12B14	flight crew's attempted recovery is incorrect. Given an extreme attitude where recovery is attempted using the correct action, that the flight crew's action is insufficient to regain control.	3;	13; 14; 15; 16; 23;	36; 37; 38; 39; 41; 42;	48; 50; 61; 62; 63 48; 50; 51; 54; 55; 58 59; 60; 61; 62; 63
5	Lack of attitude monitoring	ER12B21	Given an extreme attitude is commanded by the PF, there is no monitoring by the pilot not flying (PNF).	3;	13; 14; 15; 16; 23;	36; 37; 38; 39; 41; 42;	48; 50; 51; 54; 55; 58 59; 60; 61; 62; 63
6	Failure of attitude monitoring	ER12B22	Given an extreme attitude is commanded by a PF being monitored by the PNF, the PNF does not recognise the command is incorrect.	3;	13; 14; 15; 16; 23;	36; 37; 38; 39; 41; 42;	48; 50; 51; 54; 55; 58 59; 60; 61; 62; 63



			CATS ESD base Events and 05 ASC				
7	Failure to communicate warning	ER12B23	Given an extreme attitude is commanded by a PF and is recognised as incorrect by the PNF, the PNF fails to communicate with the PF.	3;	13; 14; 15; 16; 23;	36; 37; 38; 39; 41; 42;	48; 50; 51; 54; 55; 58 59; 60; 61; 62; 63
8	Lack of response to warning	ER12B24	Given an extreme attitude is commanded by a PF that is challenged by the PNF, that the PF does not correct it in time to prevent an extreme attitude developing.	3;	13; 14; 15; 16; 23;	36; 37; 38; 39; 41; 42;	48; 50; 51; 54; 55; 58 59; 60; 61; 62; 63
_	Flight control system failure	50405044		-	42.44.22	20.44.42	50 54 54 55 50 5
	Rudder failure	ER13F311	Failure of any part of the rudder	5;	13; 14; 22;	38; 41; 42;	50; 51; 54; 55; 58; 59 60; 61; 62; 63
		ER13F312	Rudder deflects without commands from flight crew, due to rudder failure		13; 14; 22;	38; 41; 42;	50; 51; 54; 55; 58; 59 60; 61; 62; 63
7		ER13F321	Failure of any part of the horizontal stabiliser	5;	13; 14; 22;	38; 41; 42;	50; 51; 54; 55; 58; 59 60; 61; 62; 63
8	Uncommanded stabiliser deflection	ER13F322	The horizontal stabiliser deflects without commands from the flight crew, due to a failure in horizontal stabiliser	5;	13; 14; 22;	38; 41; 42;	50; 51; 54; 55; 58; 59 60; 61; 62; 63
9	Wing control surface failure	ER13F331	Failure of any part of the wing control surface system	5;	13; 14; 22;	38; 41; 42;	50; 51; 54; 55; 58; 59 60; 61; 62; 63
10	Uncommanded wing CS deflection	ER13F332	Any part of the wing control surface deflects without commands from flight crew, due wing control surface failure	5;	13; 14; 22;	38; 41; 42;	50; 51; 54; 55; 58; 5 60; 61; 62; 63
11	Autopilot failure	ER13F41	Failure of any part of the autopilot system	1; 3;	13; 14; 15; 16; 18; 19; 21; 22;	26; 31; 35; 38; 41; 42;	47; 50; 51; 54; 55; 5 59; 60; 61; 62; 63
12	Uncommanded autopilot action	ER13F42	Autopilot system executes an action without commands from the flight crew, due to autopilot system failure	1; 3;		26; 31; 35; 38; 41; 42;	47; 50; 51; 54; 55; 5 59; 60; 61; 62; 63
13	Autothrottle failure	ER13F51	Failure of any part of the autothrottle system inside engine	9;	13; 14;	26; 38; 41; 42;	50; 51; 54; 55; 58; 5
14	Uncommanded thrust	ER13F52	An unintended thrust setting is in execution without commands by	9;	13; 14;	26; 38; 41; 42;	60; 61; 62; 63 50; 51; 54; 55; 58; 5
15	Thrust reverser failure	ER13F61	flight crew, due to autothrottle failure Failure of the thrust reverser inside engine	9;	13; 14; 21;	38; 41; 42;	60; 61; 62; 63 50; 51; 54; 55; 58; 5
16	Uncommanded deployment	ER13F62	Thrust reverser deploys without commands by flight crew, due to	9;	13; 14; 21;	38; 41; 42;	60; 61; 62; 63 50; 51; 54; 55; 58; 5
_ 1	Flight crew fails to maintain control		thrust reverser failure				60; 61; 62; 63
1	Recovery impractical	ER13B11	FCS failure is too severe, too rapid or the flight stage too critical for any effective recovery action	1; 3; 5; 9;	13; 14; 15; 16; 18; 19; 21; 22;	26; 31; 35; 38; 41; 42;	47; 50; 51; 54; 55; 5 59; 60; 61; 62; 63
2	Lack of recovery action	ER13B12	No recovery is attempted in time to recover control. This may be due to failure to recognise the FCS failure	1; 3; 5; 9;		26; 31; 35; 38; 41; 42;	47; 50; 51; 54; 55; 5 59; 60; 61; 62; 63
3	Incorrect recovery action	ER13B13	Attempted recovery action is incorrect. This may be due to flight crew not trained in control recovery from severe FCS failure	1; 3; 5; 9;		26; 31; 35; 38; 41; 42;	47; 50; 51; 54; 55; 5 59; 60; 61; 62; 63
4	Insufficient recovery action	ER13B14	Recovery action is correct but insufficient to recover control	1; 3; 5; 9;	13; 14; 15; 16; 18; 19;	26; 31; 35; 38; 41; 42;	47; 50; 51; 54; 55; 5
	Flight crew incapacitation				21; 22;		59; 60; 61; 62; 63
	· · · · · · · · · · · · · · · · · · ·	ER14F3	Flight crew incapacitates due to medical illness or injuries.		13; 15; 19; 20; 21;	31; 32; 34; 35; 41;	47; 50; 51; 59; 60; 6 62; 63
	response	ER14B2	Given the flight deck is depressurised, flight crew fails to response adequately and hence are incapacitated		13; 15; 19; 20; 21;	31; 32; 34; 35; 41;	47; 50; 51; 59; 60; 6 62; 63
6	Toxic gas in flight deck	ER14F51	Presence of toxic gas inside the flight deck		13; 15; 19; 20; 21;	31; 32; 34; 35; 41;	47; 50; 51; 59; 60; 6 62; 63
	Unsuccessful flight deck smoke procedures	ER14B3	Given the presence of toxic gas in flight deck, flight crew fails to response adequately and hence are incapacitated		13; 15; 19; 20; 21;	31; 32; 34; 35; 41;	47; 50; 51; 59; 60; 6 62; 63
		ER14F41111	The Cabin Pressure Control System (CPCS) fails during flight		13; 15; 19; 20; 21;	31; 32; 34; 35; 41;	47; 50; 51; 59; 60; 6 62; 63
9	Depressurisation	ER14F41112	Given a failure in CPCS, the flight deck is depressurised		13; 15; 19; 20; 21;	31; 32; 34; 35; 41;	47; 50; 51; 59; 60; 6 62; 63
	Depressurisation due to incorrect CPCS	ER14F4112	Flight deck is depressurised as a result of incorrect operation of the CPCS		13; 15; 19; 20; 21;	31; 32; 34; 35; 41;	47; 50; 51; 59; 60; 6 62; 63
\rightarrow	apa ara	ER14F41211	One or more of the aircraft doors fail during flight		15; 19; 20; 21;	31; 32; 33; 34; 35;	47; 50; 51; 54; 55; 5
12	Depressurisation	ER14F41212	Given a door failure, the flight deck is depressurised		15; 19; 20; 21;	31; 32; 33; 34; 35;	59; 60; 61; 62; 63 47; 50; 51; 54; 55; 5
13	Window failure in flight	ER14F41221	One or more of the aircraft window fail during flight		15; 19; 20; 21;	31; 32; 33; 34; 35;	59; 60; 61; 62; 63 47; 50; 51; 54; 55; 5
14	Depressurisation	ER14F41222	Given a window failure, the flight deck is depressurised		15; 19; 20; 21;	31; 32; 33; 34; 35;	59; 60; 61; 62; 63 47; 50; 51; 54; 55; 5
15	Fuselage failure due to deterioration	ER14F41231	Fuselage fails as a result of deterioration		15; 19; 20; 21;	31; 32; 33; 34; 35;	59; 60; 61; 62; 63 47; 50; 51; 54; 55; 5
16	Fuselage failure due to bird strike	ER14F41232	Fuselage fails as a result of bird strike		15; 19; 20; 21; 22;	31; 32; 33; 34; 35; 36;	59; 60; 61; 62; 63 47; 50; 51; 54; 55; 5
17	Fuselage failure due to tail strike	ER14F41323	Rear of fuselage strike the runway during take-off or landing		15; 19; 20; 21;	37; 38; 39; 31; 32; 33; 34; 35;	59; 60; 61; 62; 63 47; 49; 50; 51; 54; 5
	Fuselage failure due to impact while on		Impact damage while on the ground, due to taxi collision, ground			31; 32; 33; 34; 35; 43;	58; 59; 60; 61; 62; 6 45; 46; 47; 48; 50; 5
	ground	ERITI 41324	vehicle impact, etc.		11, 12, 13, 13, 20, 21,	44	52; 53; 54; 55; 56; 5 58; 59; 60; 61; 62; 6
	Flight crew fails to maintain control	ED44D44	All flights are selfer as in a shaking at the		14. 12. 12. 15. 10. 20.	24. 22. 22. 24. 25. 26.	
	Simultaneous incapacitation of all flight crew	EK14B11	All flight crew suffer an incapacitation at the same time		11; 12; 13; 15; 19; 20; 21; 22;	31; 32; 33; 34; 35; 36; 37; 38; 39; 41; 43; 44	45; 46; 47; 48; 49; 5 51; 52; 53; 54; 55; 5 57; 58; 59; 60; 61; 6
2	Lack of response to pilot incapacitation	ER14B12	Failure to recognise the Pilot flying (PF) is incapacitated, resulting in no appropriate action being taken in time to recover control of the aircraft		11; 12; 13; 15; 19; 20; 21; 22;	31; 32; 33; 34; 35; 36; 37; 38; 39; 41; 43; 44	63 45; 46; 47; 48; 49; 5 51; 52; 53; 54; 55; 5 57; 58; 59; 60; 61; 6
	Incorrect response to pilot incapacitation	ER14B13	Other flight crew recognise that PF is incapacitated but perform an incorrect response and are unable to recover control of the aircraft		11; 12; 13; 15; 19; 20; 21; 22;	31; 32; 33; 34; 35; 36; 37; 38; 39; 41; 43; 44	63 45; 46; 47; 48; 49; 5 51; 52; 53; 54; 55; 5 57; 58; 59; 60; 61; 6
	Ice accretion on aircraft	ED15D21	leing condition is not detected, due to failure of outcometi-	6.	12: 14: 21:	21. 41. 42.	
9	lcing conditions not detected	ER15B31	Icing condition is not detected, due to failure of automatic ice- detection, failure of flight crew to monitor airframe icing, or glaze ice is invisible to flight crew	6;	13; 14; 21;	31; 41; 42;	48; 50; 51; 54; 55; 5 59; 60; 61; 62; 63
10	Anti-icing system not used	ER15B32	Anti-icing system is not operating due to flight crew misjudge the licing severity		13; 14; 21;	31; 41; 42;	48; 50; 51; 54; 55; 5 59; 60; 61; 62; 63
11	Anti-icing system failure	ER15B33	Anti-icing system is not operational	6;	13; 14; 21;	31; 41; 42;	48; 50; 51; 54; 55; 5 59; 60; 61; 62; 63
12	Anti-icing procedures not followed	ER15B34	Anti-icing procedure is not followed by the flight crew, i.e. failure to		13; 14; 21;	31; 40; 41; 42;	48; 50; 51; 54; 55; 5
13	Icing exceeding anti-icing capability	ER15B35	operate the system as intended Icing condition exceeds the capacity of the anti-icing system		13; 14; 21;	31; 41; 42;	59; 60; 61; 62; 63 48; 50; 51; 54; 55; 5



			CATS ESD base Events and 03 ASC	05 51 13			
	Flight into icing conditions	ER15F	Given there is unsuccessful ice protection, aircraft continues flight into icing condition		13; 14; 21;	31; 41; 42;	48; 50; 51; 54; 55; 5 59; 60; 61; 62; 63
	Flight crew fails to respond Ice accretion not detected	ER15B21	No warning is delivered to alert the flight crew of ice accretion on	3; 6;	13; 14; 21;	31; 40; 41; 42;	48; 50; 51; 54; 55; 5
6	Lack of response to ice accretion	ER15B22	aircraft surface A warning is delivered but flight crew take no respond action	6;	13; 14; 21;	31; 40; 41; 42;	59; 60; 61; 62; 63 48; 50; 51; 54; 55; 5 59; 60; 61; 62; 63
7	Incorrect response to ice accretion	ER15B23	A warning is delivered but flight crew's attempted action is incorrect	6;	13; 14; 21;	31; 40; 41; 42;	48; 50; 51; 54; 55; 5 59; 60; 61; 62; 63
8	Insufficient response to ice accretion	ER15B24	A warning is delivered to alert flight crew. A correct respond action is attempted but not sufficient to remove the aircraft from icing condition	6;	13; 14; 21;	31; 40; 41; 42;	48; 50; 51; 54; 55; 5 59; 60; 61; 62; 63
	Flight crew fails to maintain control Recovery impractical	ER15B11	Loss of control is too severe or the flight stage is too critical for any	3; 6;	13; 14; 21;	31; 40; 41; 42;	48; 50; 51; 54; 55; 5
2	Lack of recovery action	ER15B12	effective recovery action No recovery is attempted in time to recover control, despite there	3; 6;	13; 14; 21;	31; 40; 41; 42;	59; 60; 61; 62; 63 48; 50; 51; 54; 55; 5
3	Incorrect recovery action	ER15B13	being sufficient time for recovery Attempted action is incorrect. This may be because the flight crew	3; 6;	13; 14; 21;	31; 40; 41; 42;	59; 60; 61; 62; 63 48; 50; 51; 54; 55; 59; 60; 61; 62; 63
4	Insufficient recovery action	ER15B14	are not trained in control recovery Recovery action is correct but not enough to recover control	3; 6;	13; 14; 21;	31; 40; 41; 42;	48; 50; 51; 54; 55; 59; 60; 61; 62; 63
П	Flight instrument failure						
9	Pitot-static port covers not removed	ER16F3111	Anti-contamination covers of the pitot static tube are not removed before flight and affect the measurement of the airspeed and altitude		13; 14; 21; 22;	31; 41; 42;	50; 51; 54; 55; 58; 60; 61; 62; 63
10	Flight into icing conditions	ER16F	Aircraft flies into icing condition voluntarily or compulsorily		13; 14; 21; 22;	31; 41; 42;	48; 50; 51; 54; 55; 59; 60; 61; 62; 63
11	Pitot-static ice protection system failure	ER16B31	lce protection system of the pitot-static system fails so that the port/ tube is blocked by ice		13; 14; 21; 22;	31; 41; 42;	48; 50; 51; 54; 55; 59; 60; 61; 62; 63
	Pitot-static ice protection system not used	ER16B32	Ice protection system of the pitot static system is not used during flight so that the port/ tube is blocked by ice		13; 14; 21; 22;	31; 41; 42;	48; 50; 51; 54; 55; 59; 60; 61; 62; 63
	Pitot-static system blocked by contamination	ER16F3113	Pitot static system is blocked by contamination, e.g. ash and insects	-	13; 14; 21;	31; 41; 42;	50; 51; 54; 55; 58; 60; 61; 62; 63
	Pitot-static system leak	ER16F3114	Leakage from the Pitot static system causes the system to return inadequate measurement	3;	13; 14; 21;	31; 41; 42;	50; 51; 54; 55; 58; 60; 61; 62; 63
	ASI anomaly	ER16F312	Given the pitot static system fails during flight, the ASI receives incorrect measurement and hence gives adequate information of airspeed and altitude		13; 14; 21;	31; 41; 42;	50; 51; 54; 55; 58; 9 60; 61; 62; 63
	ADI failure in flight	ER16F321	Attitude Director Indicator (ADI) fails during flight	3;	13; 14; 21;	31; 41; 42;	50; 51; 54; 55; 58; 50; 60; 61; 62; 63
	ASI anomaly	ER16F322	Given ADI fails during flight, the ASI receives incorrect measurement and hence fails to display adequate flight information	3;	13; 14; 21;	31; 41; 42;	50; 51; 54; 55; 58; ! 60; 61; 62; 63
	ASI failure in flight	ER16F331	ASI system fails during flight	3;	13; 14; 21;	31; 41; 42;	50; 51; 54; 55; 58; 60; 61; 62; 63
	ASI anomaly	ER16F332	Given ASI system fails during flight, it fails to display adequate flight information	3;	13; 14; 21;	31; 41; 42;	50; 51; 54; 55; 58; 60; 61; 62; 63
	PFD failure in flight	ER16F341	Primary Flight Display (PFD) system fails during flight	1;	22;		48; 50; 51; 54; 55; 59; 60; 61; 62; 63
	ASI anomaly Flight crew failure to maintain control	ER16F342	Given PFD fails during flight, ASI fails to display adequate flight information	1;	22;		48; 50; 51; 54; 55; 59; 60; 61; 62; 63
	Recovery impractical	ER16B11	Loss of control is too severe or the flight stage is too critical for any effective recovery action	1; 3;	13; 14; 21; 22;	31; 41; 42;	48; 50; 51; 54; 55; 59; 60; 61; 62; 63
	Lack of recovery action	ER16B12	No recovery is attempted in time to recover control. This may be due to failure to recognise the FCS failure	1; 3;	13; 14; 21; 22;	31; 41; 42;	48; 50; 51; 54; 55; 59; 60; 61; 62; 63
3	Incorrect recovery action	ER16B13	An attempted recovery is executed but the action is incorrect. This may be due to flight crew are not trained in control recovery from severe FCS failure	1; 3;	13; 14; 21; 22;	31; 41; 42;	48; 50; 51; 54; 55; 59; 60; 61; 62; 63
4	Insufficient recovery action	ER16B14	The attempted recovery action is correct but insufficient to recover control	1; 3;	13; 14; 21; 22;	31; 41; 42;	48; 50; 51; 54; 55; 59; 60; 61; 62; 63
5	Flight instrument failure not detected	ER16B21	The flight instrument failure is not detected as there is no cross check between flight crew or failure is not detectable through cross check	1; 3;	13; 14; 21; 22;	31; 41; 42;	48; 50; 51; 54; 55; 59; 60; 61; 62; 63
6	Lack of response to flight instrument failure	ER16B22	Flight instrument failure is detected but no action is taken to recover reliable flight information	1; 3;	13; 14; 21; 22;	31; 41; 42;	48; 50; 51; 54; 55; 59; 60; 61; 62; 63
	Incorrect response to flight instrument failure		Flight instrument failure is detected but the attempt to recover reliable flight information is incorrect	1; 3;	13; 14; 21; 22;	31; 41; 42;	48; 50; 51; 54; 55; 59; 60; 61; 62; 63
8	Insufficient response to flight instrument failure	ER16B24	Flight instrument failure is detected. The attempt to recover reliable flight information is correct but not enough to make full recovery	1; 3;	13; 14; 21; 22;	31; 41; 42;	48; 50; 51; 54; 55; 59; 60; 61; 62; 63
	Aircraft encounters adverse weather Severe Clear Air Turbulence (CAT)	ER17B1111	Severe Clear Air Turbulence (CAT) occurs along the flight route of		13; 19; 21;	31; 33; 34; 35; 41;	47; 48; 50; 51; 54;
2	No indication of severe CAT	ER17B11121	the aircraft Encounter with severe CAT is completely unexpected		13; 19; 21;	31; 33; 34; 35; 41;	58; 59; 60; 61; 62; 47; 48; 50; 51; 54; 58: 59: 60: 61: 62:
3	Inadequate information from preceding aircraft	ER17B11122	Flight crew request information from the preceding aircraft but they either give inaccurate information concerning the weather		13; 19; 21;	31; 33; 34; 35; 41;	58; 59; 60; 61; 62; 47; 48; 50; 51; 54; 58; 59; 60; 61; 62;
4	Encounter too sudden	ER17B11123	picture or fail to give any information CAT is expected but the encounter is so sudden such that an avoidance is impractical		13; 19; 21;	31; 33; 34; 35; 41;	47; 48; 50; 51; 54; 58; 59; 60; 61; 62;
5	Unfavourable weather conditions	ER17B1121	Storm conditions or weather fronts along the flight route of the aircraft, severe enough to cause occupant injury, control upset or		13; 19; 21;	31; 33; 34; 35; 41;	47; 48; 50; 51; 54; 56; 57; 58; 59; 60;
6	Weather report information	ER17B112211	structural damage A weather report is obtained by the flight crew but the information		13; 19; 21;	31; 33; 34; 35; 41;	62; 63 47; 48; 50; 51; 54;
7	inadequate Flight crew fail to obtain weather reports	ER17B112212	is incorrect, resulting in a turbulence encounter Weather report is not obtained by flight crew and hence weather conditions are not anticipated correctly, resulting in a turbulence		13; 19; 21;	31; 33; 34; 35; 41;	58; 59; 60; 61; 62; 47; 48; 50; 51; 56; 59; 60; 61; 62; 63
8	Onboard weather radar failure	ER17B112213	encounter Failure of on board weather radar system, preventing weather		13; 19; 21;	31; 33; 34; 35; 41;	47; 48; 50; 51; 54;
9	Unsuccessful weather information management	ER17B112214	avoidance, resulting in a turbulence encounter Flight crew use the on board weather system incorrectly, resulting in a turbulence encounter		13; 19; 21;	31; 33; 34; 35; 40; 41;	58; 59; 60; 61; 62; 47; 48; 50; 51; 54; 58; 59; 60; 61; 62;
	Flight crew disregard weather	ER17B112215	Flight crew receive adequate weather information but do not		13; 19; 21;	31; 33; 34; 35; 41;	47; 48; 50; 51; 54; !
10	information		believe it, resulting in a turbulence encounter		1		58; 59; 60; 61; 62; 6



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12	Flight crew unable to avoid unfavourable weather conditions	ER17B112222	Flight crew are unable to avoid flying into unfavourable weather, resulting in turbulence encounter		13; 19; 21;	31; 33; 34; 35; 41;	47; 48; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
13	Aircraft suffers severe upset	ER17B121	The aircraft suffers rapid changes in altitude, speed and attitude		13; 14; 19; 21;	31; 33; 34; 35; 41; 42;	47; 48; 50; 51; 54; 55;
1.4	Aircraft suffers structural damage	ER17B122	The aircraft suffers structural damage		21;	31;	58; 59; 60; 61; 62; 63
14	Aircraft Suriers Structural damage	EN1/B122	The aircraft suriers structural damage		21,	51,	48; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
15	No time to secure cabin	ER17B12311	The encounter is too sudden such that there is no time to secure		21;	31;	48; 50; 51; 54; 55; 58;
16	Flight crew fail to secure cabin	ER17B12312	the cabin Flight crew fail to alert the passengers and cabin crew as to the		21;	31;	59; 60; 61; 62; 63 48; 50; 51; 54; 55; 58;
10	riight crew fan to secure cabin	CK17B1Z51Z	necessity of securing the cabin		21,	51,	59; 60; 61; 62; 63
17	Unsuccessful securing of cabin	ER17B12313	An attempt is made to secure the cabin but this is unsuccessful		21;	31;	48; 50; 51; 54; 55; 58;
18	Occupants suffer significant injury	ER17B1232	Given that the cabin is not secured during the turbulence		14; 21;	31; 42;	59; 60; 61; 62; 63 48; 50; 51; 54; 55; 58;
			encounter, the passengers or cabin crew suffer significant injuries				59; 60; 61; 62; 63
	Ultimate design load exceeded Flight crew command extreme	ER17B211	During the encounter with adverse weather, the flight crew		13; 14; 19; 21;	31; 33; 34; 35; 40; 41;	47; 48; 50; 51; 54; 55;
	manoeuvre	EN175211	voluntarily execute an extreme manoeuvre		15, 11, 15, 11,	42;	56; 57; 58; 59; 60; 61;
20	Turbulence causes extreme manoeuvre	ED470242	The turbulence-induced motions cause an extreme manoeuvre		12: 14: 10: 21:	24. 22. 24. 25. 40. 44.	62; 63
20	Turbulence causes extreme manoeuvre	EK1/B212	The turbulence-induced motions cause an extreme manoeuvre		13; 14; 19; 21;	31; 33; 34; 35; 40; 41; 42;	47; 48; 50; 51; 54; 55; 56; 57; 58; 59; 60; 61;
							62; 63
21	Ultimate design load exceeded	ER17B22	Given an extreme manoeuvre, the aircraft design loads are exceeded, causing the break-up in-flight		13; 14; 19; 21;	31; 33; 34; 35; 40; 41; 42;	47; 48; 50; 51; 54; 55 56; 57; 58; 59; 60; 61
						,	62; 63
	Flight crew fail to maintain control Adverse weather makes aircraft	ER17B31	No input to controls will allow the flight crew to maintain control of		13; 14; 19; 21;	31; 33; 34; 35; 40; 41;	47; 48; 50; 51; 54; 55
22	uncontrollable	EK1/B31	the aircraft after the turbulence encounter		13; 14; 19; 21;	42;	56; 57; 58; 59; 60; 61
							62; 63
23	Lack of control	ER17B32	The pilot makes no attempt to control the aircraft after the turbulence encounter		13; 14; 19; 21;	31; 33; 34; 35; 40; 41; 42;	47; 48; 50; 51; 54; 55; 56; 57; 58; 59; 60; 61;
			tarbalence encounter			72,	62; 63
24	Incorrect control	ER17B33	The pilot applies incorrect or insufficient control to the aircraft,		13; 14; 19; 21;	31; 33; 34; 35; 40; 41;	47; 48; 50; 51; 54; 55
			after the aircraft encounters turbulence. This can be due to improper training, stress and fatigue			42;	56; 57; 58; 59; 60; 61 62; 63
	Single Engine Failure						
1	Reduction Gear Failure	ER18B1111	The failure of the reduction gear within the jet engine	9;		26; 27; 31; 33; 34; 35;	47; 50; 51; 54; 55; 58
2	Severe Failure	ER18B1112	A severe failure occurs given that the reduction gear fails	9;	21; 22; 13; 14; 16; 18; 19; 20;	36; 41; 42; 26; 27; 31; 33; 34; 35;	59; 60; 61; 62; 63 47; 50; 51; 54; 55; 58
					21; 22;	36; 41; 42;	59; 60; 61; 62; 63
3	Compressor Failure	ER18B1121	The failure of the compressor section within the jet engine.	9;	13; 14; 16; 18; 19; 20; 21; 22;	26; 27; 31; 33; 34; 35; 36; 41; 42;	47; 49; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
4	Severe Failure	ER18B1122	A severe failure occurs given that the compressor fails	9;		26; 27; 31; 33; 34; 35;	47; 49; 50; 51; 54; 55;
		504004404			21; 22;	36; 41; 42;	58; 59; 60; 61; 62; 63
5	Combustor Failure	ER18B1131	The failure of the combustor section within the jet engine	9;	13; 14; 16; 18; 19; 20; 21; 22;	26; 27; 31; 33; 34; 35; 36; 41; 42;	47; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
6	Severe Failure	ER18B1132	A severe failure occurs given that the combustor fails	9;	13; 14; 16; 18; 19; 20;	26; 27; 31; 33; 34; 35;	47; 50; 51; 54; 55; 58;
7	Turbine Failure	ER18B1141	The failure of the turbine section within the jet engine	9;	21; 22; 13; 14; 16; 18; 19; 20;	36; 41; 42; 26; 27; 31; 33; 34; 35;	59; 60; 61; 62; 63 47; 50; 51; 54; 55; 58;
,	Turbine ranure	CK10B1141	The failure of the turbine section within the jet engine	3,	21; 22;	36; 41; 42;	59; 60; 61; 62; 63
8	Severe Failure	ER18B1142	A severe failure occurs given that the turbine fails	9;		26; 27; 31; 33; 34; 35;	47; 50; 51; 54; 55; 58;
9	Oil Distribution System Failure	ER18B1151	The oil distribution system within the jet engine fails leading to a	9;	21; 22; 13; 14; 16; 18; 19; 20;	36; 41; 42; 26; 27; 31; 33; 34; 35;	59; 60; 61; 62; 63 47; 50; 51; 54; 55; 58;
	on bistribution system runare		lack of lubrication of the rotating parts		21; 22;	36; 41; 42;	59; 60; 61; 62; 63
10	Severe Failure	ER18B1152	A severe failure occurs given that the oil distribution fails	9;		26; 27; 31; 33; 34; 35;	47; 50; 51; 54; 55; 58
11	Accessory Drive Failure	ER18B1161	The accessory drive within the jet engine fails preventing the	9;	21; 22; 13; 14; 16; 18; 19; 20;	36; 41; 42; 26; 27; 31; 33; 34; 35;	59; 60; 61; 62; 63 47; 50; 51; 54; 55; 58
			proper working of oil, hydraulic and fuel systems		21; 22;	36; 41; 42;	59; 60; 61; 62; 63
12	Severe Failure	ER18B1162	A severe failure occurs given that the accessory drive fails	9;	13; 14; 16; 18; 19; 20; 21; 22;	26; 27; 31; 33; 34; 35; 36; 41; 42;	47; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
13	Icing Conditions	ER18B12111	The occurrence of conditions conducive to icing as a percentage of	6; 9;		26; 31; 33; 34; 35; 36;	47; 48; 50; 51; 54; 55;
		50400404404	the total flight time The engine de-ice/anti-ice system fails		42.45.40.40.20.24	37; 38; 39; 41;	58; 59; 60; 61; 62; 63
14	Engine Anti-Ice Unavailable	ER18B121121	The engine de-ice/anti-ice system fails	6; 9;	13; 16; 18; 19; 20; 21;	26; 31; 33; 34; 35; 36; 37; 38; 39; 41;	47; 48; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
15	Engine Anti-Ice Utilisation Failure	ER18B121122	The engine de-ice/anti-ice system is not used or used incorrectly by	6; 9;	13; 16; 18; 19; 20; 21;	26; 31; 33; 34; 35; 36;	47; 48; 50; 51; 54; 55;
16	Ice shed from wings enters engine	ER18B121123	flight crew Ice accumulated on wings enters the aircraft engine	9;	13; 16; 18; 19; 20; 21;	37; 38; 39; 41; 26; 31; 33; 34; 35; 36;	58; 59; 60; 61; 62; 63 47; 48; 50; 51; 54; 55;
_ 10	nee shed from wings enters engine	100121123	rec accommunica on wings enters the ancian engine	,	13, 10, 10, 13, 20, 21,	37; 38; 39; 41;	58; 59; 60; 61; 62; 63
17	Ice impact causes damage to engine	ER18B121131	Ice dislodges from the wing or the nacelle of the engine and	9;	13; 16; 18; 19; 20; 21;	26; 31; 33; 34; 35; 36;	47; 48; 50; 51; 54; 55
			impacts upon the fan blades. The damage could also be caused by the impact of hail.			37; 38; 39; 41;	58; 59; 60; 61; 62; 63
18	Ice restricts airflow	ER18B121132	Ice build up within the engine restricts the flow of air into the	6; 9;	13; 16; 18; 19; 20; 21;	26; 31; 33; 34; 35; 36;	47; 48; 50; 51; 54; 55
			combustor resulting in a fuel rich mixture within the combustor			37; 38; 39; 41;	58; 59; 60; 61; 62; 63
19	Thrust reduction	ER18B121133	leading to a flame-out lce either builds up on the fuel inlets reducing the flow of oil or	9;	13; 16; 18; 19; 20; 21;	26; 31; 33; 34; 35; 36;	47; 48; 50; 51; 54; 55;
			builds up on the engine pressure ratio (EPR) pilot tubes giving false	,	. , , , , , , ,	37; 38; 39; 41;	58; 59; 60; 61; 62; 63
			& high EPR readings that the auto throttle system will counter by reducing the thrust.				
20	Severe storm conditions	ER18B12121	The occurrence of severe storm conditions as a percentage of the	6; 9;	13; 16; 18; 19; 20; 21;	26; 31; 33; 34; 35; 36;	47; 48; 50; 51; 54; 55
			total flight time			37; 38; 39; 41;	58; 59; 60; 61; 62; 63
21	A/C unable to avoid storm	ER18B121221	The storm is too large to avoid or occurs rapidly leaving the flight crew with no time to respond	6; 9;	13; 16; 18; 19; 20; 21;	26; 31; 33; 34; 35; 36; 37; 38; 39; 41;	47; 48; 50; 51; 54; 55 58; 59; 60; 61; 62; 63
22	PIC commands flight into storm	ER18B121222	The pilot continues flight into the storm given that it could have	6; 9;	13; 16; 18; 19; 20; 21;	26; 31; 33; 34; 35; 36;	47; 48; 50; 51; 54; 55
	Date acception of the control of the	ED40042477	been avoided	C: 0:	42-46-40-40-55-5	37; 38; 39; 41;	58; 59; 60; 61; 62; 63
23	Rain quantity exceeds operating limits of engine	ER18B121231	The storm conditions are too intense such that the engine cannot operate.	6; 9;	13; 16; 18; 19; 20; 21;	26; 31; 33; 34; 35; 36; 37; 38; 39; 41;	47; 48; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
24	Flight crew fails to maintain engine	ER18B121232	Flight crew fail to maintain a high enough engine rotational speed	6; 9;	13; 16; 18; 19; 20; 21;	26; 31; 33; 34; 35; 36;	47; 48; 50; 51; 54; 55
	speed		(45% of maximum) such that the engine becomes saturated with			37; 38; 39; 41;	58; 59; 60; 61; 62; 63
25	Fuel System Maintenance Failure	ER18B122111	water. The fuel system is not correctly maintained which is revealed by the	4;	13; 16; 18; 19; 20; 21;	26; 31; 33; 34; 35; 36;	47; 50; 51; 59; 60; 61
	-		in-flight failure of said system and the resulting fuel leak			37; 38; 39; 41;	62; 63
26	Fuel System Damaged	ER18B122112	The fuel system is damaged by another part of the aircraft or by a foreign object and is revealed in-flight by the leaking of fuel	4;	13; 16; 18; 19; 20; 21;	26; 31; 33; 34; 35; 36; 37; 38; 39; 41;	47; 50; 51; 54; 55; 58 59; 60; 61; 62; 63
	Fuel Distribution System Failure	ER18B1221211	Failure in fuel distribution system for the engine	4;	13; 16; 18; 19; 20; 21;	26; 31; 33; 34; 35; 36;	47; 50; 51; 54; 55; 58
27	•	I				37; 38; 39; 41;	59; 60; 61; 62; 63
	Distribution Failure	ER18B1221212	The failure of the distribution system is severe enough that no fuel is transferred to one or more of the engines which eventually	4;	13; 16; 18; 19; 20; 21;	26; 31; 33; 34; 35; 36; 37; 38; 39; 41;	47; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63



	Control Surfaces in incorrect configuration	ER18B1221221	The flight control surfaces are in a high drag position either due to pilot actions or failure of the systems controlling them		13; 14; 16; 18; 19; 20; 21; 22;	26; 31; 33; 34; 35; 36; 37; 38; 39; 41; 42;	47; 50; 51; 54; 55; 58 59; 60; 61; 62; 63
6	Undercarriage Failure	ER18B1221222	The undercarriage in a high drag position either due to pilot actions or failure of the systems controlling it	7;	14; 23;	26; 42;	50; 51; 54; 55; 58; 59 60; 61; 62; 63
31	FCMC Failure	ER18B1222111	The Fuel Control Management Computers are dependent upon the fuel distribution system. If the fuel distribution system fails then the FCMCs will. The failure of the FCMCs will result in a warning being displayed upon the Electronic Central Advisory Monitor (ECAM) but no advisory that the fuel system might not be operable. As a result of this a fuel starvation problem might occur	3;	13; 14; 16; 18; 19; 20; 21; 22;	26; 31; 33; 34; 35; 36; 37; 38; 39; 41; 42;	47; 50; 51; 54; 55; 58 59; 60; 61; 62; 63
32	No ECAM	ER18B12221121	There is no Electronic Centralised Aircraft Monitor (ECAM) installed	3;	13; 15; 16; 17; 21;	26; 39;	50; 51; 54; 55; 58; 59
33	ECAM gives insufficient advisory action	ER18B12221122	insufficient to alert the flight crew to the severity of the fuel	3; 4;	13; 14; 16; 18; 19; 20; 21; 22;	26; 31; 33; 34; 35; 36; 37; 38; 39; 41; 42;	60; 61; 62; 63 47; 50; 51; 54; 55; 5 59; 60; 61; 62; 63
34	ECAM Failure	ER18B12221123	problem A part of the ECAM system fails resulting in no warning being given	3; 4; 9;	13; 14; 16; 18; 19; 20; 21; 22;	26; 31; 33; 34; 35; 36; 37; 38; 39; 41; 42;	47; 50; 51; 54; 55; 5 59; 60; 61; 62; 63
35	Lack of monitoring	ER18B1222121	The flight crew fail to monitor the other fuel status flight instruments to determine whether or not there is a fuel problem	4;	13; 16; 18; 19; 20; 21;	26; 31; 33; 34; 35; 36; 37; 39; 41;	47; 50; 51; 54; 55; 5 59; 60; 61; 62; 63
36	Insufficient Monitoring	ER18B1222122	The flight crew do not carry out sufficient checks on the fuel status to fully identify the fuel problem	4;	13; 16; 18; 19; 20; 21;	26; 31; 33; 34; 35; 36; 37; 39; 41;	47; 50; 51; 54; 55; 5 59; 60; 61; 62; 63
37	Flight crew ignore independent checks	ER18B1222123	The flight crew make independent checks on the fuel status but do not believe that there is a problem	4;	13; 16; 18; 19; 20; 21;	26; 31; 33; 34; 35; 36; 37; 39; 41;	47; 50; 51; 54; 55; 5 59; 60; 61; 62; 63
38	Crew response inadequate	ER18B12222	The crew understand that a fuel problem will develop yet take	4;	13; 16; 18; 19; 20; 21;	26; 31; 33; 34; 35; 36;	47; 50; 51; 54; 55; 5
39	Foreign Object Damage	ER18B131	inappropriate actions to prevent fuel starvation The engine mount is struck by a foreign object. This can include but is not exclusive to birds and detachment of objects from the aircraft	9;	13; 16; 18; 19; 20; 21;	37; 39; 41; 26; 31; 33; 34; 35; 36; 37; 39; 41;	59; 60; 61; 62; 63 47; 50; 51; 54; 55; 5 59; 60; 61; 62; 63
40	Engine Mount Design Failure Revealed	ER18B1321	The design of the engine mount is inadequate and this is revealed during flight by the loading upon the mount	9;	13; 14; 16; 18; 19; 20; 21;	26; 31; 33; 34; 35; 36; 37; 39; 41; 42;	47; 50; 51; 54; 55; 5 59; 60; 61; 62; 63
41	Engine Mount Maintenance Failure Revealed	ER18B1322	The maintenance of the engine mount is performed inadequately and this is revealed in flight by the loading on the mount	9;	13; 14; 16; 18; 19; 20; 21;	26; 31; 33; 34; 35; 36; 37; 39; 41; 42;	47; 48; 50; 51; 54; 5 58; 59; 60; 61; 62; 6
42	Load exceeds engine mount design load	ER18B133		9;	13; 14; 16; 18; 19; 20; 21;	26; 31; 33; 34; 35; 36; 37; 39; 41; 42;	47; 48; 50; 51; 54; 5 58; 59; 60; 61; 62; 6
43	Turbulent Conditions	ER18B141		9;	13; 14; 16; 18; 19; 20; 21;	26; 31; 33; 34; 35; 36; 37; 39; 41; 42;	47; 48; 50; 51; 54; 5 58; 59; 60; 61; 62; 6
44	Flight crew command altitude outside engine operating envelope	ER18B142		9;	13; 14; 16; 18; 19; 20; 21;	26; 31; 33; 34; 35; 36; 37; 39; 41; 42;	47; 48; 50; 51; 54; 5 58; 59; 60; 61; 62; 6
45	Engine Thrust too high for altitude	ER18B1431	The flight crew apply a thrust setting that is too high for the altitude at which the aircraft is operating leading to an aerodynamic stall and an unrecoverable compressor urge	9;	13; 14; 16; 18; 19; 20; 21;	26; 31; 33; 34; 35; 36; 37; 39; 41; 42;	47; 48; 50; 51; 54; 5 58; 59; 60; 61; 62; 6
46	Rapid change in engine thrust	ER18B1432	The flight crew apply a rapid change in the thrust setting that leads to an aerodynamic stall and an unrecoverable compressor surge	9;	13; 14; 16; 18; 19; 20; 21;	26; 31; 33; 34; 35; 36; 37; 39; 41; 42;	47; 48; 50; 51; 54; 58; 59; 60; 61; 62;
	Flight crew fail to restart engine	5040004		24670			
47	Restart Unnecessary	ER18B21	Due to redundancy the restart of an engine is deemed unnecessary.	3; 4; 6; 7; 9;	13; 14; 15; 16; 17; 18; 19; 20; 21; 22; 23;	26; 27; 31; 33; 34; 35; 36; 37; 38; 39; 41; 42;	47; 48; 49; 50; 51; 55; 58; 59; 60; 61; 63
48	Aircraft too low to allow restart	ER18B221	The priority of the flight crew following an engine failure is to maintain control of the aircraft. If the aircraft is at a low altitude it will be impractical, due to the high workload, for the flight crew to attempt a restart whilst attempting to maintain control of the aircraft	3; 4; 6; 7; 9;	13; 14; 15; 16; 17; 18; 19; 20; 21; 22; 23;	26; 27; 31; 33; 34; 35; 36; 37; 38; 39; 41; 42;	47; 48; 49; 50; 51; 5 55; 58; 59; 60; 61; 6 63
49	Engine too damaged	ER18B222	The engines are too damaged for a restart to be practical	3; 4; 6; 7; 9;	13; 14; 15; 16; 17; 18; 19; 20; 21; 22; 23;	26; 27; 31; 33; 34; 35; 36; 37; 38; 39; 41; 42;	47; 48; 49; 50; 51; 55; 58; 59; 60; 61; 6
50	Engine not attached	ER18B223	The engines are not attached and a restart would hence be impossible	3; 4; 6; 7; 9;	13; 14; 15; 16; 17; 18; 19; 20; 21; 22; 23;	26; 27; 31; 33; 34; 35; 36; 37; 38; 39; 41; 42;	47; 48; 49; 50; 51; 55; 58; 59; 60; 61; 6
51	A/C System Failure prevents restart	ER18B231	The engine restart system fails and prevents a restart of the engine to be performed	3; 4; 6; 7; 9;	13; 14; 15; 16; 17; 18; 19; 20; 21; 22; 23;	26; 27; 31; 33; 34; 35; 36; 37; 38; 39; 41; 42;	47; 48; 49; 50; 51; 55; 58; 59; 60; 61; 63
52	Flight Crew unable to perform APU Restart	ER18B232	The flight crew are unable to perform an Auxiliary Power Unit (APU) restart either due to the flight crew performing the restart incorrectly or due to the engine not responding	3; 4; 6; 7; 9;	13; 14; 15; 16; 17; 18; 19; 20; 21; 22; 23;	26; 27; 31; 33; 34; 35; 36; 37; 38; 39; 41; 42;	47; 48; 49; 50; 51;
53	Restart not attempted	ER18B24	Given that the restart is necessary, the flight crew do not perform a restart	3; 4; 6; 7; 9;	13; 14; 15; 16; 17; 18; 19; 20; 21; 22; 23;	26; 27; 31; 33; 34; 35; 36; 37; 38; 39; 41; 42;	47; 48; 49; 50; 51; 55; 58; 59; 60; 61; 63
	Dual Engine Failure Severe Engine Damage	ER18B311	Damage on the second engine, caused by the first, is severe enough that second engine power is lost	3; 4; 6; 7; 9;	13; 14; 15; 16; 17; 18; 19; 20; 21; 22; 23;	26; 27; 31; 33; 34; 35; 36; 37; 38; 39; 41; 42;	47; 48; 49; 50; 51; 55; 58; 59; 60; 61;
55	Second Engine damaged by first	ER18B312	Debris from the first engine failure damages the second engine	3; 4; 6; 7; 9;	13; 14; 15; 16; 17; 18; 19; 20; 21; 22; 23;	26; 27; 31; 33; 34; 35; 36; 37; 38; 39; 41; 42;	63 47; 48; 49; 50; 51; 55; 58; 59; 60; 61;
56	Single Engine suffers Ice Flame-out	ER18B32111	The first engine suffers an ice induced flame-out	6; 9;	13; 14; 15; 16; 17; 18; 19; 20; 21; 22; 23;	26; 27; 31; 33; 34; 35; 36; 37; 38; 39; 41; 42;	63 47; 48; 49; 50; 51; 55; 58; 59; 60; 61;
57	Second Engine suffers Ice Flame-out	ER18B32112	The second engine suffers an ice induced flame-out	6; 9;	13; 14; 15; 16; 17; 18; 19; 20; 21; 22; 23;	26; 27; 31; 33; 34; 35; 36; 37; 38; 39; 41; 42;	63 47; 48; 49; 50; 51; 55; 58; 59; 60; 61;
58	Single Engine suffers Rain Flame-out	ER18B32121	The first engine suffers a rain induced flame-out	6; 9;	13; 14; 15; 16; 17; 18; 19; 20; 21; 22; 23;	26; 27; 31; 33; 34; 35; 36; 37; 38; 39; 41; 42;	47; 48; 49; 50; 51; 55; 58; 59; 60; 61; 63
59	Second Engine suffers Rain Flame-out	ER18B32122	The second engine suffers a rain induced flame-out	6; 9;	13; 14; 15; 16; 17; 18; 19; 20; 21; 22; 23;	26; 27; 31; 33; 34; 35; 36; 37; 38; 39; 41; 42;	47; 48; 49; 50; 51; 55; 58; 59; 60; 61; 63
60	Single Engine suffers Fuel Exhaustion	ER18B3221	The first engine suffers fuel starvation	6; 9;	13; 14; 15; 16; 17; 18; 19; 20; 21; 22; 23;	26; 27; 31; 33; 34; 35; 36; 37; 38; 39; 41; 42;	47; 48; 49; 50; 51; 55; 58; 59; 60; 61; 63
61	Fuel starvation occurs simultaneously	ER18B32221	Given that the first engine suffers fuel starvation the second suffers an almost simultaneous starvation	6; 9;	13; 14; 15; 16; 17; 18; 19; 20; 21; 22; 23;	26; 27; 31; 33; 34; 35; 36; 37; 38; 39; 41; 42;	47; 48; 49; 50; 51; 55; 58; 59; 60; 61; 6
		ER18B32222	Given that the first engine suffers fuel starvation, the flight crew fail		13; 14; 15; 16; 17; 18;	26; 27; 31; 33; 34; 35;	47; 48; 49; 50; 51; 5



			CATS ESD Base Events and 63 ASC	000.15			
63	Crew response inadequate	ER18B32223	The crew understand that a fuel problem will develop yet take inappropriate actions to prevent fuel starvation	6; 9;	13; 14; 15; 16; 17; 18; 19; 20; 21; 22; 23;	26; 27; 31; 33; 34; 35; 36; 37; 38; 39; 41; 42;	47; 48; 49; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
64	Single Engine separates	ER18B331	The first engine separates from the aircraft	6; 9;	13; 14; 15; 16; 17; 18; 19; 20; 21; 22; 23;	26; 27; 31; 33; 34; 35; 36; 37; 38; 39; 41; 42;	47; 48; 49; 50; 51; 54; 55; 58; 59; 60; 61; 62
65	Second Engine struck by First Engine	ER18B3321	The first engine on separation strikes a second engine causing it to separate. It should be noted that this can only occur on a four	6; 9;	13; 14; 15; 16; 17; 18; 19; 20; 21; 22; 23;	26; 27; 31; 33; 34; 35; 36; 37; 38; 39; 41; 42;	47; 48; 49; 50; 51; 54; 55; 58; 59; 60; 61; 62;
	Second Engine separates independently	ER18B3322	engine aircraft The second engine separation is independent of the first	6; 9;	13; 14; 15; 16; 17; 18; 19; 20; 21; 22; 23;	26; 27; 31; 33; 34; 35; 36; 37; 38; 39; 41; 42;	47; 48; 49; 50; 51; 54 55; 58; 59; 60; 61; 62
67	Single Engine suffers surge	ER18B341	The first engine suffers a compressor surge	6; 9;	13; 14; 15; 16; 17; 18; 19; 20; 21; 22; 23;	26; 27; 31; 33; 34; 35; 36; 37; 38; 39; 41; 42;	63 47; 48; 49; 50; 51; 54 55; 58; 59; 60; 61; 62
68	Simultaneous surge	ER18B3421	Given that the first engine suffers a surge the second engine suffers an almost simultaneous one	6; 9;	13; 14; 15; 16; 17; 18; 19; 20; 21; 22; 23;	26; 27; 31; 33; 34; 35; 36; 37; 38; 39; 41; 42;	63 47; 48; 49; 50; 51; 54 55; 58; 59; 60; 61; 62
69	Second Engine surges independently	ER18B3422	A second engine surge occurs independently of the first	6; 9;	13; 14; 15; 16; 17; 18; 19; 20; 21; 22; 23;	26; 27; 31; 33; 34; 35; 36; 37; 38; 39; 41; 42;	63 47; 48; 49; 50; 51; 54 55; 58; 59; 60; 61; 62
70	Aircraft too low to allow restart	ER18B3511	The priority of the flight crew following an engine failure is to maintain control of the aircraft. If the aircraft is at a low altitude it will be impractical, due to the high workload, for the flight crew to attempt a restart whilst attempting to maintain control of the	6; 9;	13; 14; 15; 16; 17; 18; 19; 20; 21; 22; 23;	26; 27; 31; 33; 34; 35; 36; 37; 38; 39; 41; 42;	63 47; 48; 49; 50; 51; 54 55; 58; 59; 60; 61; 62 63
71	Engines too damaged	ER18B3512	aircraft Both engines are severely damaged such that a power restart is not practically possible	6; 9;	13; 14; 15; 16; 17; 18; 19; 20; 21; 22; 23;	26; 27; 31; 33; 34; 35; 36; 37; 38; 39; 41; 42;	47; 48; 49; 50; 51; 54 55; 58; 59; 60; 61; 62
72	Engines not attached	ER18B3513	Both engines are not attached to the aircraft body such that a power restart is not practically possible	6; 9;	13; 14; 15; 16; 17; 18; 19; 20; 21; 22; 23;	26; 27; 31; 33; 34; 35; 36; 37; 38; 39; 41; 42;	47; 48; 49; 50; 51; 54 55; 58; 59; 60; 61; 62
73	No fuel	ER18B3514	There is no fuel so a power restart is not practically possible	6; 9;	13; 14; 15; 16; 17; 18; 19; 20; 21; 22; 23;	26; 27; 31; 33; 34; 35; 36; 37; 38; 39; 41; 42;	47; 48; 49; 50; 51; 54 55; 58; 59; 60; 61; 62
74	A/C System Failure prevents restart	ER18B3521	The engine restart system fails and prevent a restart of the engine to be performed	2; 6; 9;	13; 14; 15; 16; 17; 18; 19; 20; 21; 22; 23;	26; 27; 31; 33; 34; 35; 36; 37; 38; 39; 41; 42;	47; 48; 49; 50; 51; 54 55; 58; 59; 60; 61; 62
	Flight Crew unable to perform APU Restart	ER18B3522	The flight crew are unable to perform an Auxiliary Power Unit (APU) restart either due to the flight crew performing the restart incorrectly or due to the engine not responding	6; 9;	13; 14; 15; 16; 17; 18; 19; 20; 21; 22; 23;	26; 27; 31; 33; 34; 35; 36; 37; 38; 39; 41; 42;	47; 48; 49; 50; 51; 54 55; 58; 59; 60; 61; 62
	Flight Crew perform Incorrect Windmill Restart	ER18B3523	The flight crew do not obtain the correct speed and descent rate necessary for a windmill restart	6; 9;	13; 14; 15; 16; 17; 18; 19; 20; 21; 22; 23;	26; 27; 31; 33; 34; 35; 36; 37; 38; 39; 41; 42;	47; 48; 49; 50; 51; 54 55; 58; 59; 60; 61; 62 63
IV	Flight crew shut down wrong engine						03
77	Engine Sensor Failures	ER18B41111	The flight crew are unable to determine which engine has failed due to a failure of the engine sensors	2; 3; 4; 6; 7; 9;	13; 14; 15; 16; 17; 18; 19; 20; 21; 22; 23;	26; 27; 31; 33; 34; 35; 36; 37; 38; 39; 41; 42;	47; 48; 49; 50; 51; 54 55; 58; 59; 60; 61; 62 63
78	Dual FWS Failure	ER18B41112	Both flight warning computers (FWC) fail and no warning is displayed by the ECAM	2; 3; 4; 6; 7; 9;	13; 14; 15; 16; 17; 18; 19; 20; 21; 22; 23;	26; 27; 31; 33; 34; 35; 36; 37; 38; 39; 41; 42;	47; 48; 49; 50; 51; 54 55; 58; 59; 60; 61; 62
79	DMC Failure	ER18B41113	The ECAM display monitoring computers (DMC) fail fails so no warning can be displayed	2; 6; 9;	13; 14; 15; 16; 17; 18; 19; 20; 21; 22; 23;	26; 27; 31; 33; 34; 35; 36; 37; 38; 39; 41; 42;	47; 48; 49; 50; 51; 54 55; 58; 59; 60; 61; 62
80	Warning not Obvious	ER18B4112	The warning given is not obvious to the flight crew	2; 6; 9;	13; 14; 15; 16; 17; 18; 19; 20; 21; 22; 23;	26; 27; 31; 33; 34; 35; 36; 37; 38; 39; 41; 42;	47; 48; 49; 50; 51; 54 55; 58; 59; 60; 61; 63
81	Engine Indication Systems Failure	ER18B41131	The engine indicating systems on aircraft without ECAM fails	2; 6; 9;	13; 14; 15; 16; 17; 18; 19; 20; 21; 22; 23;	26; 27; 31; 33; 34; 35; 36; 37; 38; 39; 41; 42;	47; 48; 49; 50; 51; 54 55; 58; 59; 60; 61; 62
82	Total Loss of engine indication	ER18B41132	The aircraft suffers a total loss of all engine indications	2; 6; 9;	13; 14; 15; 16; 17; 18; 19; 20; 21; 22; 23;	26; 27; 31; 33; 34; 35; 36; 37; 38; 39; 41; 42;	47; 48; 49; 50; 51; 54 55; 58; 59; 60; 61; 62 63
83	Lack of Verification	ER18B4121	The flight crew fail to verify that an engine has failed	2; 6; 9;	13; 14; 15; 16; 17; 18; 19; 20; 21; 22; 23;	26; 27; 31; 33; 34; 35; 36; 37; 38; 39; 41; 42;	47; 48; 49; 50; 51; 54 55; 58; 59; 60; 61; 62 63
84	Inadequate Verification	ER18B4122	The flight crew check to verify which engine has failed but fail to diagnose which one has failed	2; 6; 9;	13; 14; 15; 16; 17; 18; 19; 20; 21; 22; 23;	26; 27; 31; 33; 34; 35; 36; 37; 38; 39; 41; 42;	47; 48; 49; 50; 51; 54 55; 58; 59; 60; 61; 62
85	Flight crew ignore warnings	ER18B42	The flight crew ignore the warnings relating the failed engine and shut down an operable engine	2; 6; 9;	13; 14; 15; 16; 17; 18; 19; 20; 21; 22; 23;	26; 27; 31; 33; 34; 35; 36; 37; 38; 39; 41; 42;	47; 48; 49; 50; 51; 54 55; 58; 59; 60; 61; 62 63
_	Flight crew fails to maintain control						
	Flight Control Surfaces Severely Damaged	ER18B511	The aircraft is rendered uncontrollable due to damage to the flight control surfaces following a single engine failure	2; 6; 9;	13; 14; 15; 16; 17; 18; 19; 20; 21; 22; 23;	26; 27; 31; 33; 34; 35; 36; 37; 38; 39; 41; 42;	47; 48; 49; 50; 51; 54 55; 58; 59; 60; 61; 63
87	Aircraft Stalls	ER18B512	Due to the lack of thrust from one engine the aircraft is unable to maintain the speed required to generate sufficient lift and the aircraft stalls	2; 6; 9;	13; 14; 15; 16; 17; 18; 19; 20; 21; 22; 23;	26; 27; 31; 33; 34; 35; 36; 37; 38; 39; 41; 42;	47; 48; 49; 50; 51; 54 55; 58; 59; 60; 61; 62 63
88	Lack of Immediate Flight Control	ER18B52	The flight crew fail to apply any control following the loss of one engine	2; 3; 6; 9;	13; 14; 15; 16; 17; 18; 19; 20; 21; 22; 23;	26; 27; 31; 33; 34; 35; 36; 37; 38; 39; 41; 42;	47; 48; 49; 50; 51; 54; 55; 58; 59; 60; 61; 63
	Flight crew misdiagnose which engine has failed	ER18B531	The flight crew misdiagnose which engine has failed and as a result make incorrect inputs to the controls	2; 6; 9;	13; 14; 15; 16; 17; 18; 19; 20; 21; 22; 23;	26; 27; 31; 33; 34; 35; 36; 37; 38; 39; 41; 42;	47; 48; 49; 50; 51; 54 55; 58; 59; 60; 61; 63
90	Flight crew apply incorrect controls	ER18B532	The flight crew apply immediate and continuing control that is incorrect following a single engine failure	2; 6; 9;	13; 14; 15; 16; 17; 18; 19; 20; 21; 22; 23;	26; 27; 31; 33; 34; 35; 36; 37; 38; 39; 41; 42;	47; 48; 49; 50; 51; 54 55; 58; 59; 60; 61; 63
VI	Flight crew fails to maintain control						0.5
91	Flight Control Surfaces Severely Damaged	ER18B611	The aircraft is rendered uncontrollable due to damage to the flight control surfaces following a single engine failure	2; 6; 9;	13; 14; 15; 16; 17; 18; 19; 20; 21; 22; 23;	26; 27; 31; 33; 34; 35; 36; 37; 38; 39; 41; 42;	47; 48; 49; 50; 51; 5 55; 58; 59; 60; 61; 6
92	Aircraft Stalls	ER18B612	Due to the lack of thrust from one engine the aircraft is unable to maintain the speed required to generate sufficient lift and the	2; 6; 9;	13; 14; 15; 16; 17; 18; 19; 20; 21; 22; 23;	26; 27; 31; 33; 34; 35; 36; 37; 38; 39; 41; 42;	47; 48; 49; 50; 51; 5- 55; 58; 59; 60; 61; 6:
93	Lack of Immediate Flight Control	ER18B62	aircraft stalls The flight crew fail to apply any control following the loss of one	2; 6; 9;	13; 14; 15; 16; 17; 18;	26; 27; 31; 33; 34; 35;	47; 48; 49; 50; 51; 5
		I	engine	I	19; 20; 21; 22; 23;	36; 37; 38; 39; 41; 42;	55; 58; 59; 60; 61; 6



			CATS ESD base Events and 05 ASC				
	Immediate & Continuing Control Incorrect	ER18B63	The momentary or continuous control by flight crew is inadequate after total power loss	2; 6; 9;	13; 14; 15; 16; 17; 18; 19; 20; 21; 22; 23;	26; 27; 31; 33; 34; 35; 36; 37; 38; 39; 41; 42;	47; 48; 49; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
	Aircraft unable to reach airport Aircraft fails to return to departure airport	ER18B71	The flight crew elect to return to the departure airport following total power loss but are unable to reach it	2; 6; 9;	13; 14; 15; 16; 17; 18; 19; 20; 21; 22; 23;	26; 27; 31; 33; 34; 35; 36; 37; 38; 39; 41; 42;	47; 48; 49; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
96	Aircraft fails to reach destination airport	ER18B72	The flight crew elect to continue to the destination airport following total power loss but are unable to reach it	2; 6; 9;	13; 14; 15; 16; 17; 18; 19; 20; 21; 22; 23;	26; 27; 31; 33; 34; 35; 36; 37; 38; 39; 41; 42;	47; 48; 49; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
97	Flight Crew unable to maintain control on approach	ER18B731	After electing divert to an alternate airport, the flight crew are unable to maintain control of the aircraft	2; 6; 9;	13; 14; 15; 16; 17; 18; 19; 20; 21; 22; 23;	26; 27; 31; 33; 34; 35; 36; 37; 38; 39; 41; 42;	47; 48; 49; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
98	Distance to airport greater than glide distance	ER18B732	The aircraft is too far from the airport to glide and has to make a forced landing	2; 6; 9;	13; 14; 15; 16; 17; 18; 19; 20; 21; 22; 23;	26; 27; 31; 33; 34; 35; 36; 37; 38; 39; 41; 42;	47; 48; 49; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
99	Diversion occurs too late	ER18B733	The flight crew decide to divert too late into the flight and as a result the aircraft fails to reach the airport. This can be due to the flight crew miscalculating fuel reserves of failing to declare an emergency in time	2; 6; 9;	13; 14; 15; 16; 17; 18; 19; 20; 21; 22; 23;	26; 27; 31; 33; 34; 35; 36; 37; 38; 39; 41; 42;	47; 48; 49; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
	Airport not suitable	ER18B734	The only available airport cannot be used as it is either too small or closed	2; 6; 9;	13; 14; 15; 16; 17; 18; 19; 20; 21; 22; 23;	26; 27; 31; 33; 34; 35; 36; 37; 38; 39; 41; 42;	47; 48; 49; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
	Unstable Approach						
	Poor manual flight control causes UA	AL19B111	An input to the aircraft's flight controls by flight crew results in the approach becoming destabilised, such as high sink rate, deviate above or below the glide slope, speed too fast/ slow, or aircraft not aligned with the centre line to the runway		15; 16; 17; 20; 23; 24; 25	26; 27; 32; 34; 35; 36; 38; 39;	50; 51; 54; 55; 58; 59; 61; 62;
2	Check list failure	AL19B1121	Flight crew fail to conduct briefings and checklists, which leads to a		16; 17;	26; 28; 29; 30;	50; 51; 59; 61; 62;
3	Improper control exchange	AL19B1122	CRM failure An exchange of control of the aircraft occurs at an inappropriate time during the approach or following an exchange of control, the		15; 16; 17; 19; 20; 23; 24; 25	26; 27; 29; 30; 32; 34; 35; 36; 38; 39;	50; 51; 54; 55; 58; 59; 60; 62;
4	Poor automated systems management causes UA	AL19B113	flight crew are unsure of their roles Flight crew use the flight management system inappropriately. Flight management system includes the Autopilot and auto throttle		15; 16; 17; 19; 20; 23; 24; 25	26; 27; 32; 34; 35; 36; 38; 39; 40;	47; 50; 51; 54; 55; 58; 59; 60; 62;
5	Loss of visual	AL19B121	systems among others Flight crew losses visual reference with the runway when not on an ILS approach		15; 16; 17; 19; 20; 23; 24; 25	26; 27; 32; 34; 35; 36; 38; 39;	47; 48; 50; 51; 52; 53; 56; 57; 58; 59; 60; 62; 63
	Severe turbulence	AL19B122	Turbulence is so severe that no control input will stabilise the approach		16; 18; 19; 20; 21; 23;	26; 31; 34; 35; 36; 39;	48; 50; 51; 54; 55; 58; 59; 60; 61; 62;
	Crosswind exceeded Flight crew fails to initiate and execute	AL19B123	Crosswind component for the aircraft is exceeded and it becomes unsafe for the aircraft to land		14; 16; 17; 23;	26; 35; 36; 39; 42;	48; 50; 51; 52; 53; 54; 55; 58; 59; 60; 61; 62;
"	missed approach						
8	Flight crew fail to recognise unstable approach	AL19B211	Both pilot and co-pilot fail to recognise the symptoms of an unstable approach and hence a missed approach is not initiated		14; 15; 16; 17; 18; 19; 20; 21; 23; 24; 25	26; 27; 28; 29; 30; 31; 32; 34; 35; 36; 38; 39; 40; 42;	47; 48; 50; 51; 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
9	Crew fail to respond appropriately to unstable approach	AL19B212	Flight crew recognise the unstable approach but are not able to take appropriate action to initiate a missed approach		14; 15; 16; 17; 18; 19; 20; 21; 23; 24; 25	26; 27; 28; 29; 30; 31; 32; 34; 35; 36; 38; 39; 40; 42;	47; 48; 50; 51; 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
10	AOA protection prevents MA	AL19B221	After initiating a missed approach, the AOA protection system activates and prevents the flight crew from executing the missed approach. AOA prevention system activates when the nose of the aircraft is pulled up sharply and is designed to prevent the aircraft from stalling		13; 14; 15; 16; 17; 18; 19; 20; 21; 23; 24; 25	26; 27; 28; 29; 30; 31; 32; 34; 35; 36; 38; 39; 40; 41; 42;	47; 48; 50; 51; 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
	PF fails to execute correctly	AL19B222	Flight crew initiate a missed approach but fail to take appropriate action to execute the missed approach		14; 15; 16; 17; 18; 19; 20; 21; 23; 24; 25	26; 27; 28; 29; 30; 31; 32; 34; 35; 36; 38; 39; 40; 42;	47; 48; 50; 51; 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
	Flight crew fails to maintain control Uncontrollable	AL19B31	No input to controls will allow the flight crew to maintain control of		13; 14; 15; 16; 17; 18;	26; 27; 28; 29; 30; 31;	47; 48; 50; 51; 52; 53;
			the aircraft after failing to initiate or execute a missed approach		19; 20; 21; 23; 24; 25	32; 34; 35; 36; 38; 39; 40; 41; 42;	54; 55; 56; 57; 58; 59; 60; 61; 62; 63
	Lack of control	AL19B32	The pilot makes no attempt to control the aircraft after failing to initiate or execute a missed approach		19; 20; 21; 23; 24; 25	40; 41; 42;	47; 48; 50; 51; 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
	Incorrect Control	AL19B33	The pilot applies incorrect control to the aircraft, after failing to initiate or execute a missed approach. This can be due to improper training, stress and fatigue		13; 14; 15; 16; 17; 18; 19; 20; 21; 23; 24; 25	26; 27; 28; 29; 30; 31; 32; 34; 35; 36; 38; 39; 40; 41; 42;	47; 48; 50; 51; 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
	Insufficient control	AL19B34	The pilot applies correct measures after failing to initiate or execute a missed approach, but these are not enough to maintain control		13; 14; 15; 16; 17; 18; 19; 20; 21; 23; 24; 25	26; 27; 28; 29; 30; 31; 32; 34; 35; 36; 38; 39; 40; 41; 42;	47; 48; 50; 51; 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
	Structural failure			-	40.44.55.55	00.07.07.77	47.40.55.55
	Structure too weak	AL19B41	Landing gear/structure is too weak due to manufacturing defect, improper maintenance or improper design	7;	13; 14; 15; 16; 17; 18; 19; 20; 21; 23; 24; 25	26; 27; 28; 29; 30; 31; 32; 34; 35; 36; 38; 39; 40; 41; 42;	47; 48; 50; 51; 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
	Design load exceeded	AL19B42	Landing gear/structure is its designed strength but the excessive landing load causes failure	7;	13; 14; 15; 16; 17; 18; 19; 20; 21; 23; 24; 25	26; 27; 28; 29; 30; 31; 32; 34; 35; 36; 38; 39; 40; 41; 42;	47; 48; 50; 51; 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
	Flight crew fail to maintain control	AL 10DE1	No input to controls will allow the Bi-bt counts are interested.	7.	13. 14. 15. 45. 47. 42	26, 27, 20, 20, 20, 21	47, 49, 50, 54, 53, 53
	Uncontrollable	AL19B51	No input to controls will allow the flight crew to maintain control of the aircraft after suffering structural failure caused by hard landing		13; 14; 15; 16; 17; 18; 19; 20; 21; 23; 24; 25	26; 27; 28; 29; 30; 31; 32; 34; 35; 36; 38; 39; 40; 41; 42;	47; 48; 50; 51; 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
	Lack of control	AL19B52	The pilot makes no attempt to control the aircraft after suffering structural failure caused by hard landing	7;	13; 14; 15; 16; 17; 18; 19; 20; 21; 23; 24; 25	26; 27; 28; 29; 30; 31; 32; 34; 35; 36; 38; 39; 40; 41; 42;	47; 48; 50; 51; 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
20	Incorrect Control	AL19B53	The pilot applies incorrect control to the aircraft after suffering structural failure caused by hard landing. This can be due to improper training, stress and fatigue	7;	13; 14; 15; 16; 17; 18; 19; 20; 21; 23; 24; 25	26; 27; 28; 29; 30; 31; 32; 34; 35; 36; 38; 39; 40; 41; 42;	47; 48; 50; 51; 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
	Insufficient control	AL19B54	The pilot applies correct measures after aircraft suffering structural failure caused by hard landing, but these are not enough to prevent aircraft leaving off the side of the runway	7;	13; 14; 15; 16; 17; 18; 19; 20; 21; 23; 24; 25	26; 27; 28; 29; 30; 31; 32; 34; 35; 36; 38; 39; 40; 41; 42;	47; 48; 50; 51; 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
	Failure to achieve maximum braking Insufficient runway length	AL19B61	Runway can be too short under wet or icy runway conditions for plane to stop even if touchdown is successful and brakes are applied and functioning.		13; 14; 15; 16; 17; 18; 19; 20; 21; 23; 24; 25	26; 27; 28; 29; 30; 31; 32; 34; 35; 36; 38; 39; 40; 41; 42;	47; 48; 50; 51; 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63



Part Part							
24 State not applied correctly A1990-3 Figlior core's failure to am sporters during the separation of page year to include the staply before the season and applied in the season of the seaso	23 Brakes not functionin	ng correctly AL19B62		7; 9;			47; 48; 50; 51; 52; 5 54; 55; 56; 57; 58; 5 60; 61; 62; 63
Position Position	24 Brakes not applied co	orrectly AL19B63	touchdown, failure in CRM leading to brakes not being applied, failure to apply brakes soon after touchdown, disengaging brakes			26; 27; 28; 29; 30; 31; 32; 34; 35; 36; 38; 39;	47; 48; 50; 51; 52; 5 54; 55; 56; 57; 58; 5 60; 61; 62; 63
No impact to control will allow the flight crow to maintain carrol of the internal factor executing and approach to the internal factor executing and approach to the internal factor executing and approach to the internal factor executing and approach to the internal factor executing and approach to the internal factor executing and approach to the internal factor executing and approach to the internal factor executing and approach to the internal factor executing a mixed approach. This can be due to improper families, these and approach to the internal factor executing a mixed approach. This can be due to improper families, these and approach to the internal factor executing a mixed approach. This can be due to improper families, these and approach approach to the internal factor executing a mixed approach. This can be due to improper families, these and approach approach to the internal factor executing a paper families. The internal factor executing a paper families and approach to the internal families and approach approach to the internal families and approach approach to the internal families and approach approach to the internal families and approach approach to the internal families and approach approach to the internal families and approach approach to the internal families and approach approach approach to the internal families and approach approa	VII Flight crew fail to mai	aintain control	during tarraing ron				
The pitch makes no attempt to control the aircraft after executing a missed approach (1), 20, 12, 22, 42, 25 (a), 60, 62, 62, 62, 62, 62, 62, 62, 62, 62, 62			No input to controls will allow the flight crew to maintain control	of	14: 15: 16: 17: 18: 19:	26: 27: 28: 29: 30: 31:	47; 48; 50; 51; 52; 5
Miles Mile			the aircraft after executing a missed approach		20; 21; 23; 24; 25	32; 34; 35; 36; 38; 39; 40; 42;	54; 55; 56; 57; 58; 5 60; 61; 62; 63
missed approach. This can be due to improper training, stress and feature. \$20,21,23,41,25 \$23,34,35,36,38,39 \$43,50 \$4	26 Lack of control	AL19B72	The state of the s	; a		32; 34; 35; 36; 38; 39;	47; 48; 50; 51; 52; 5 54; 55; 56; 57; 58; 5 60; 61; 62; 63
AL198121 The plot applies correct measures after executing a mixed port of the plot of the number of the side of the number of the side of the number of the side of the number of the side of the number of the side of the number of the side of the number of the side of the number of the numbe	27 Incorrect Control	AL19B73	missed approach. This can be due to improper training, stress and			26; 27; 28; 29; 30; 31; 32; 34; 35; 36; 38; 39;	47; 48; 50; 51; 52; 5 54; 55; 56; 57; 58; 5 60; 61; 62; 63
Value Septiment Value	28 Insufficient control	AL19B74	The pilot applies correct measures after executing a missed approach but are not enough to prevent aircraft leaving off the si	de		26; 27; 28; 29; 30; 31; 32; 34; 35; 36; 38; 39;	47; 48; 50; 51; 52; 5 54; 55; 56; 57; 58; 5 60; 61; 62; 63
23 Sign rew ait to notify ATC of inadequate servers 31,151,162,173,183,194,182,233,333,333,334,334,335,333,334,344,223,343,353,333,344,342,344,344,344,344,344,344,34		lable for next	or the runway			40, 42,	60, 61, 62, 63
Sufficient for aircraft to perform the next approach 20,11,23, 24, 25 32, 24, 53, 58, 38, 39, 54, 62, 62, 62, 63, 62, 63, 62, 63, 62, 63, 62, 63, 62, 63, 62, 63, 63, 63, 63, 64, 64, 62, 63, 63, 63, 63, 64, 64, 62, 63, 63, 63, 63, 64, 64, 62, 63, 63, 63, 63, 64, 64, 62, 63, 63, 63, 64, 64, 62, 63, 63, 63, 64, 64, 62, 63, 63, 63, 64, 64, 62, 63, 64, 64, 62, 63, 64, 64, 62, 63, 64, 64, 62, 64, 64, 62, 64, 64, 64, 64, 64, 64, 64, 64, 64, 64		tify ATC of AL19B811	Flight crew do not inform the ATC that the fuel reserve is not		14; 15; 16; 17; 18; 19;	26; 27; 28; 29; 30; 31;	47; 48; 50; 51; 52; 5
planning planning 20;12;23;42;5 32;43;53;63;83;9 54; 62; 62; 63; 64; 64; 62; 65; 65; 63; 64; 6	·					40; 42;	54; 55; 56; 57; 58; 5 60; 61; 62; 63
31 Aircraft diverted from other location Al.1988122 Aircraft consumes extra fuel during flight due to a route diversion 12, 15, 15, 17, 18, 19, 26, 27, 28, 29, 30, 31, 47, 40, 42, 60, 42, 40	6 Poor flight planning	AL19B812				32; 34; 35; 36; 38; 39;	47; 48; 50; 51; 52; 5 54; 55; 56; 57; 58; 5 60; 61; 62; 63
International Processing Service Service	31 Aircraft diverted from	m other location AL19B812	2 Aircraft consumes extra fuel during flight due to a route diversion			26; 27; 28; 29; 30; 31; 32; 34; 35; 36; 38; 39;	47; 48; 50; 51; 52; 5 54; 55; 56; 57; 58; 5 60; 61; 62; 63
Intrins	32 Aircraft executes mul	ultiple MA AL19B82	previously, and hence the reserved fuel is not sufficient to perfor	m		32; 34; 35; 36; 38; 39;	47; 48; 50; 51; 52; 5 54; 55; 56; 57; 58; 5 60; 61; 62; 63
Aircraft Overweight	_	lance Outside					
2 Incorrect or No Load Sheet Al. Al. 2181 22 31, 39, 41; 42; 50;		AL21B11	Weight of the aircraft exceeds the take-off limit		13; 14; 18; 22;	31; 39; 41; 42;	50; 51; 52; 53; 54; 5 59; 60; 61; 62; 63
Incorrectly distributed in the load So.	2 Incorrect or No Load	Sheet AL21B121	The load sheet at take-off is incorrect or no load sheet is presented	ed	13; 14; 18; 22;	31; 39; 41; 42;	50; 51; 52; 53; 54; 5 59; 60; 61; 62; 63
Filight Crew Command Fuel Transfer AL2181321 Filight Crew command an incorrect fuel transfer leading to a weight and balance problem 13; 18; 21; 31; 33; 34; 35; 36; 37; 47; 59; 6 Fuel System Failure AL21813221 Failure of any part of the engine fuel distribution system 4; 9; 13; 18; 21; 31; 33; 34; 35; 36; 37; 47; 59; 7 Uncommanded Fuel Transfer AL21813222 Due to failure of the engine fuel distribution system, fuel is ransferred without commendation from flight crew 4; 9; 13; 18; 21; 31; 33; 34; 35; 36; 37; 39; 41; 47; 59; 8 Fuel Load Distribution incorrect AL2181323 Fuel distribution at take-off is incorrect 13; 14; 18; 21; 22; 31; 35; 36; 37; 39; 41; 47; 59; 6 Fuel Load Distribution incorrect AL2181323 Fuel distribution at take-off is incorrect 13; 14; 18; 21; 22; 31; 35; 36; 37; 39; 41; 47; 59; 6 Fuel Load Distribution incorrect AL2181323 Fuel distribution at take-off is incorrect 13; 14; 18; 21; 22; 31; 35; 36; 37; 39; 41; 47; 59; 6 Fuel Load Distribution incorrect AL21814 Cargo moves in the hold during flight 13; 14; 18; 21; 22; 31; 35; 36; 37; 39; 41; 47; 59; 6 Fuel Load Distribution incorrect AL21814 Cargo moves in the hold during flight 13; 14; 18; 21; 22; 31; 35; 36; 37; 39; 41; 47; 59; 6 Fuel Load Distribution incorrect AL21814 Cargo moves in the hold during flight 13; 14; 18; 21; 22; 31; 35; 36; 37; 39; 41; 47; 59; 6 Fuel Load Distribution incorrect AL21815 Fuel Report			incorrectly distributed in the load				50; 51; 52; 53; 54; 5 59; 60; 61; 62; 63
Second S			fuel to be transferred along length of the plane				50; 51; 52; 53; 54; 5 59; 60; 61; 62; 63
6 Fuel System Failure AL21B13221 Failure of any part of the engine fuel distribution system. 4; 9; 13; 18; 21; 31; 33; 34; 35; 36; 37; 39; 41; 69; 59; 69; 69; 69; 69; 69; 69; 69; 69; 69; 6	5 Flight Crew Command	nd Fuei Transfer ALZ1B132		nt	13; 18; 21;		47; 50; 51; 54; 55; 5 59; 60; 61; 62; 63
Repair Section Secti	6 Fuel System Failure	AL21B132	21 Failure of any part of the engine fuel distribution system	4; 9;	13; 18; 21;		47; 50; 51; 54; 55; 5 59; 60; 61; 62; 63
Fuel Load Distribution Incorrect AL21B1323 Fuel distribution at take-off is incorrect 13; 14; 18; 21; 22; 31; 35; 36; 37; 39; 41; 47; 59; 6 59; 6	7 Uncommanded Fuel 1	Transfer AL21B132	, ,	4; 9;	13; 18; 21;		47; 50; 51; 54; 55; 5
Solution Solution	8 Fuel Load Distribution	on Incorrect AL21B132			13: 14: 18: 21: 22:		59; 60; 61; 62; 63 47; 50; 51; 54; 55; 5
10 Failure to Diagnose Problem AL21B21 Flight crew fail to diagnose the reason for the weight and balance problems. The problem is either revealed too late, not detected or misdiagnosed 13; 14; 18; 21; 22; 31; 35; 36; 37; 39; 41; 47; 59; 61 42; 42; 47; 59; 61 42; 42; 47; 59; 61 42; 42; 43; 35; 36; 37; 39; 41; 47; 59; 61 42; 42; 43; 35; 36; 37; 39; 41; 47; 59; 61 42; 42; 43; 34; 35; 36; 37; 39; 41; 47; 59; 63 43; 61 42; 43; 61 42; 43; 61 43; 61 43; 61 44;							59; 60; 61; 62; 63
Problems Problem Pro						42;	47; 50; 51; 54; 55; 5 59; 60; 61; 62; 63
resolve it. This can be due to the problem being irresolvable, flight crew ignoring the problem or unsuccessful resolution of the problem. II Flight Crew Fails to Maintain Control Stall Unavoidable AL21B311 No input to controls will allow the flight crew to avoid the stall AL21B312 Flight crew fail to avoid the stall which is possible to be avoided 4; 9; 13; 14; 18; 21; 22; 31; 33; 34; 35; 36; 37; 47; 55; 56; 39; 41; 42; 39; 41; 42; 31; 33; 34; 35; 36; 37; 39; 41; 42; 55; 56; 63 14 Control Unrecoverable AL21B321 No action will allow the flight crew to regain control 4; 9; 13; 14; 18; 21; 22; 31; 33; 34; 35; 36; 37; 39; 41; 42; 55; 56; 63 15 Lack of Control AL21B322 The pilot makes no attempt to control the aircraft. 4; 9; 13; 14; 18; 21; 22; 31; 33; 34; 35; 36; 37; 39; 41; 42; 55; 56; 63 63 63 63	10 Failure to Diagnose Pi	Problem ALZ1BZ1	problems. The problem is either revealed too late, not detected of		13; 14; 18; 21; 22;		47; 50; 51; 54; 55; 5 59; 60; 61; 62; 63
12 Stall Unavoidable AL21B311 No input to controls will allow the flight crew to avoid the stall 4; 9; 13; 14; 18; 21; 22; 31; 33; 34; 35; 36; 37; 47; 55; 55; 55; 51; 51; 51; 51; 51; 51; 51			resolve it. This can be due to the problem being irresolvable, fligh crew ignoring the problem or unsuccessful resolution of the		13; 14; 18; 21; 22;		47; 50; 51; 54; 55; 5 59; 60; 61; 62; 63
39; 41; 42; 55; 563 13 Pilot fails to avoid stall AL21B312 Flight crew fail to avoid the stall which is possible to be avoided 4; 9; 13; 14; 18; 21; 22; 31; 33; 34; 35; 36; 37; 47; 55; 563 14 Control Unrecoverable AL21B321 No action will allow the flight crew to regain control 4; 9; 13; 14; 18; 21; 22; 31; 33; 34; 35; 36; 37; 47; 53; 63 15 Lack of Control AL21B322 The pilot makes no attempt to control the aircraft. 4; 9; 13; 14; 18; 21; 22; 31; 33; 34; 35; 36; 37; 47; 53; 63 16 San AL21B322 The pilot makes no attempt to control the aircraft. 4; 9; 13; 14; 18; 21; 22; 31; 33; 34; 35; 36; 37; 47; 53; 63				4	1	 	I
13 Pilot fails to avoid stall AL21B312 Flight crew fail to avoid the stall which is possible to be avoided 4; 9; 13; 14; 18; 21; 22; 31; 33; 34; 35; 36; 37; 55; 56; 37 47; 55; 56; 56; 57 14 Control Unrecoverable AL21B321 No action will allow the flight crew to regain control 4; 9; 13; 14; 18; 21; 22; 31; 33; 34; 35; 36; 37; 47; 55; 56; 37 47; 55; 56; 37 15 Lack of Control AL21B322 The pilot makes no attempt to control the aircraft. 4; 9; 13; 14; 18; 21; 22; 31; 33; 34; 35; 36; 37; 47; 55; 55; 55; 55; 55; 55; 55; 55; 55; 5	12 Stall Unavoidable	AL21B311	No input to controls will allow the flight crew to avoid the stall	4; 9;	13; 14; 18; 21; 22;		55; 58; 59; 60; 61; 6
14 Control Unrecoverable AL21B321 No action will allow the flight crew to regain control 4; 9; 13; 14; 18; 21; 22; 31; 33; 34; 35; 36; 37; 47; 55; 55; 563 15 Lack of Control AL21B322 The pilot makes no attempt to control the aircraft. 4; 9; 13; 14; 18; 21; 22; 31; 33; 34; 35; 36; 37; 47; 55; 563 37; 41; 42; 63; 63; 63; 63; 63; 63; 63; 63; 63; 63	13 Pilot fails to avoid sta	all AL21B312	Flight crew fail to avoid the stall which is possible to be avoided	4; 9;	13; 14; 18; 21; 22;		47; 50; 51; 52; 53; 5 55; 58; 59; 60; 61; 6 63
15 Lack of Control AL21B322 The pilot makes no attempt to control the aircraft. 4; 9; 13; 14; 18; 21; 22; 31; 33; 34; 35; 36; 37; 37; 55; 55; 56; 37; 41; 42; 42; 43; 44; 42; 45; 46; 46; 46; 46; 46; 46; 46; 46; 46; 46	14 Control Unrecoverabl	ole AL21B321	No action will allow the flight crew to regain control	4; 9;	13; 14; 18; 21; 22;		47; 50; 51; 52; 53; 5 55; 58; 59; 60; 61; 6
	15 Lack of Control	AL21B322	The pilot makes no attempt to control the aircraft.	4; 9;	13; 14; 18; 21; 22;		47; 50; 51; 52; 53; 55; 58; 59; 60; 61; 6
	16 Incorrect Control	AL21B323		his 4; 9;	13; 14; 18; 21; 22;	31; 33; 34; 35; 36; 37; 39; 41; 42;	47; 50; 51; 52; 53; 55; 58; 59; 60; 61; 6



SPIs: System of

	Base events	Code	Definition	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	Base events	Code	Definition	Technology	Human	Organisation	System of
	Aircraft are positioned on collision						Organisations
Ţ,	course						
1	Strategic conflict	ER31F53	Unmodified flight plan requests would lead to separation infringement		19;	32; 33; 34; 35;	47; 50; 51; 52; 53; 56 57; 59; 60; 61; 62; 63
2	Ineffective ATFCM	ER31B10	Failure of air traffic flow and capacity management (ATFCM) to		19;	32; 33; 34; 35;	47; 50; 51; 52; 53; 50
	No ATC planning	ED24D04	prevent strategic conflict developing into pre-tactical conflict		10.	22, 22, 24, 25,	57; 59; 60; 61; 62; 6
3	No ATC planning	ER31B91	No attempts are made to identify pre-tactical conflicts before they reach the Tactical Controller		19;	32; 33; 34; 35;	47; 50; 51; 52; 53; 5 57; 59; 60; 61; 62; 6
	Inadequate strategic surveillance	ER31B9211	The radar picture is inadequate to allow the Planning Controller to		19;	32; 33; 34; 35;	47; 50; 51; 52; 53; 5
	picture		identify the pre-tactical conflict, e.g. incomplete traffic picture, picture with overlapping labels, or too much traffic for the display system				57; 59; 60; 61; 62; 6
5	Inadequate flight plan data	ER31B9212	Flight plan data is inadequate to allow the Planning Controller to		19;	32; 33; 34; 35;	47; 50; 51; 52; 53; 5
			identify the pre-tactical conflict, e.g. incorrect flight plan, flight plan insufficient to identify conflicts, flight plan strips obtained too late, or aircraft not following flight plan.				57; 59; 60; 61; 62; 6
	Planning controller failure to recognise	ER31B922	Planning Controller obtain correct flight information but fails to		19;	32; 33; 34; 35;	47; 50; 51; 52; 53; 5
	conflict		recognise medium-term conflict. This includes failure of MTCD if present				57; 59; 60; 61; 62; 6
7	Planning controller misjudgement of	ER31B923	Planning Controller aware of the conflict but misjudges the traffic		19;	32; 33; 34; 35;	47; 50; 51; 52; 53; 5
8	conflict prevention Inadequate planning controller	ER31B93	situation and results in an inadequate separation plan Planning Controller fails to coordinate with other sectors, resulting		19;	32; 33; 34; 35;	57; 59; 60; 61; 62; 6 47; 50; 51; 52; 53; 5
	coordination		in failure to implement planned traffic synchronisation				57; 59; 60; 61; 62; 6
	Planning controller failure to alert tactical controller to conflict	ER31B94	Planning Controller fails to inform Tactical Controller of a conflict		19;	32; 33; 34; 35;	47; 50; 51; 52; 53; 5 57; 59; 60; 61; 62; 6
10	Inadequate tactical surveillance picture	ER31B5111	The radar picture is inadequate to allow the Tactical Controller to		19;	32; 33; 34; 35;	47; 50; 51; 52; 53; 5
			maintain separation in a plannable conflict, e.g. incomplete traffic picture or picture with overlapping labels				57; 59; 60; 61; 62; 6
11	Inadequate flight plan data	ER31B5112	Flight plan data is inadequate to allow the Tactical Controller to		19;	32; 33; 34; 35;	47; 50; 51; 52; 53; 5
			maintain separation in a plannable conflict, e.g. incorrect flight plan, flight plan insufficient to identify conflicts, flight plan strips				57; 59; 60; 61; 62; 6
			obtained too late, or aircraft not following flight plan.				
12	ATCO failure to recognise conflict	ER31B512	Tactical Controller obtains adequate flight information but fails to recognise the conflict		19;	32; 33; 34; 35;	47; 50; 51; 52; 53; 5 57; 59; 60; 61; 62; 6
	ATCO misjudgement in tactical	ER31B513	Tactical Controller recognises the conflict, but misjudges the traffic		19;	32; 33; 34; 35;	47; 50; 51; 52; 53; 5
	separation		situation and hence makes incorrect clearances or separation instructions to the aircraft				57; 59; 60; 61; 62; 6
14	Inadequate ATCO co-ordination	ER31B514	Tactical Controller fails to coordinate with other controllers,		19;	32; 33; 34; 35;	47; 50; 51; 52; 53; 5
15	Inadequate ATCO transmission of	ER31B521	resulting in incorrect clearances or separation instructions Inadequate transmission of instruction from ATCO, e.g. incorrect		19; 20;	32; 33; 34; 35;	57; 59; 60; 61; 62; 6 47; 50; 51; 52; 53; 5
	instructions		clearance, late clearance and unclear phraseology				57; 59; 60; 61; 62; 6
16	Loss of communication	ER31B522	Communication between ATCO and pilot is lost due to technical failure or human error		19; 20; 21;	31; 32; 33; 34; 35;	47; 50; 51; 54; 55; 5 59; 60; 61; 62; 63
17	Inadequate pilot readback	ER31B523	Failure of adequate readback from pilot and failure of ATCO to		19; 20; 21;	31; 32; 33; 34; 35;	47; 50; 51; 56; 57; 5
18	Inadequate pilot response to ATC	ER31B53	challenge the failure Flight crew fail to follow the clearances or separation instructions		19; 20; 21;	31; 32; 33; 34; 35;	60; 61; 62; 63 47; 50; 51; 59; 60; 6
19	Conflict due to military traffic	ER31F6111	Unauthorised penetration of controlled airspace by military traffic		19; 20; 21;	31; 32; 33; 34; 35;	62; 63 47; 50; 51; 56; 57; 5
20	Conflict due to VFR traffic	ER31F6112	Unauthorised penetration of controlled airspace by VFR (Visual		19; 20; 21;	31; 32; 33; 34; 35;	59; 60; 61; 62; 63 47; 50; 51; 56; 57; 5
21	Inadequate ATCO transmission of	ER31F61211	Flight Rule) traffic Inadequate transmission of instruction from ATCO that leads to a		19; 20; 21;	31; 32; 33; 34; 35;	59; 60; 61; 62; 63 47; 50; 51; 56; 57; 5
	instructions		vertical deviation of the aircraft				60; 61; 62; 63
22	Inadequate pilot readback	ER31F61212	Failure of adequate readback from pilot and failure of ATCO to challenge the failure that leads to a vertical deviation of the aircraft		19; 20; 21;	31; 32; 33; 34; 35;	47; 50; 51; 56; 57; 5 59; 60; 61; 62; 63
23	Pilot handling error	ER31F6122	Vertical deviation of aircraft due to pilot handling. This also includes cases of correct readback followed by incorrect action, failures to		19; 20; 21;	31; 32; 33; 34; 35;	47; 56; 57; 59; 60; 6 62; 63
24	Altimeter setting error	ER31F6123	follow SID or climb/ descent without clearance. Vertical deviation of aircraft due to inadequate altimeter settings		19; 20; 21; 25	27; 31; 32; 33; 34; 35;	47; 50; 51; 54; 55; 5
25	Technical failure in autopilot or nav	ER31F6124	Vertical deviation of aircraft due to technical failure in autopilot or	1. 2.	19; 20; 21;	39;	59; 60; 61; 62; 63 47; 50; 51; 54; 55; 5
25	equipment	EK31F0124	navigation equipment	1; 3;	19; 20; 21;	31; 32; 33; 34; 35;	57; 58; 59; 60; 61; 6
26	ACAS RA	ER31F6125	Response to ACAS Resolution Advisory or other in-flight emergency requiring a vertical deviation		19; 20; 21;	31; 32; 33; 34; 35;	47; 50; 51; 56; 57; 5 60; 61; 62; 63
27	Weather induced level bust	ER31F6126	Vertical deviation resulting from weather conditions		19; 20; 21;	31; 32; 33; 34; 35;	47; 48; 50; 51; 54; 5 56; 57; 58; 59; 60; 6
28	Level bust results in conflict	ER31C6	Given a level bust occurs, the aircraft has separation infringement		19; 21;	31; 32; 33; 34; 35;	62; 63 47; 48; 50; 51; 56; 5
			with another aircraft				58; 59; 60; 61; 62; 6
	Inadequate tactical surveillance picture	ER31B611	The radar picture is inadequate to allow the Tactical Controller to maintain separation in an unplannable conflict, e.g. missing or unidentified targets		19; 20;	32; 33; 34; 35;	47; 50; 51; 54; 55; 5 57; 58; 59; 60; 61; 6 63
	ATCO failure to recognise conflict in time	ER31B612	ATCO fails to recognise the unplannable conflict in time to issue separation instructions		19; 20; 21;	31; 32; 33; 34; 35;	47; 50; 51; 56; 57; 5 60; 61; 62; 63
	Inadequate ATCO transmission of	ER31B621	Inadequate transmission of instruction for an unplannable conflict from ATCO results in failure to maintain separation		19; 20; 21;	31; 32; 33; 34; 35;	47; 50; 51; 56; 57; 5
32	instructions Loss of communication	ER31B622	Communication between ATCO and pilot is lost during an		19; 20; 21;	31; 32; 33; 34; 35;	60; 61; 62; 63 47; 50; 51; 54; 55; 5
			unplannable conflict due to technical failure or human error				57; 58; 59; 60; 61; 6 63
	Inadequate pilot readback	ER31B623	Failure of adequate readback from pilot during an unplannable conflict and failure of ATCO to challenge the failure		19; 20; 21;	31; 32; 33; 34; 35;	47; 50; 51; 56; 57; 5 60; 61; 62; 63
	Inadequate pilot response to ATC	ER31B63	Flight crew fail to follow the clearances or separation instructions		19; 20; 21;	31; 32; 33; 34; 35;	47; 50; 51; 56; 57; 5 60; 61; 62; 63
35	Trajectory instructions result in conflict	ER31F71	Trajectory instructions from ATCO create a conflict that was not previously present		19; 20; 21;	31; 32; 33; 34; 35;	47; 50; 51; 56; 57; 5 60; 61; 62; 63
_	Ineffective tactical separation of ATCO	CD24D7	ATCO does not recognise or resolve the conflict they have created		19; 20; 21;	31; 32; 33; 34; 35;	47; 50; 51; 56; 57; 5



SPIs: System of

	Base events	Code	Definition	SPIs: Technology	SPIs: Human	SPIs: Organisation	Organisation
27		ER31F81	A conflict occurs in uncontrolled airspace where separation is the	SPIS: Technology	18; 19; 20; 21;	31; 32; 33; 34; 35;	
3/	Conflict in uncontrolled airspace	ER31F81	The state of the s		18; 19; 20; 21;	31; 32; 33; 34; 35;	47; 50; 51; 56;
20		5004004	responsibility of the pilot		40.00.04	24 22 22 24 25	60; 61; 62; 63
38	Inadequate traffic information from ATCO	ER31B81	The controller does not attempt to provide the necessary traffic information for the pilot to maintain separation in uncontrolled		19; 20; 21;	31; 32; 33; 34; 35;	47; 50; 51; 56; 60; 61; 62; 63
	7.1165		airspace				00, 01, 02, 03
39	Inadequate ATCO transmission of	ER31B821	Inadequate transmission of traffic information prevents the pilot		19; 20; 21;	31; 32; 33; 34; 35;	47; 50; 51; 56;
	information		maintaining separation in uncontrolled airspace				60; 61; 62; 63
40	Loss of communication	ER31B822	Communication between ATCO and pilot is lost during a conflict in		19; 20; 21;	31; 32; 33; 34; 35;	47; 50; 51; 54
			uncontrolled airspace due to technical failure or human error				57; 58; 59; 60; 63
41	Inadequate pilot readback	ER31B823	Failure of adequate readback from pilot during an conflict in		19; 20; 21;	31; 32; 33; 34; 35;	47; 50; 51; 56
	,,		uncontrolled airspace and failure of ATCO to challenge the failure				60; 61; 62; 63
42	Inadequate separation by pilot	ER31B83	Pilot receives the necessary traffic information for an conflict in		19; 20; 21;	31; 32; 33; 34; 35;	47; 50; 51; 56
42	Separation recovery essential	ER31C4	controlled airspace but fails to maintain separation Given a separation infringement occurs, recovery action is needed		19; 20; 21;	31; 32; 33; 34; 35;	60; 61; 62; 63 47; 50; 51; 56
43	separation recovery essential	ER31C4	to avoid an imminent collision		19, 20, 21,	31, 32, 33, 34, 33,	60; 61; 62; 63
П	ATC fails to detect and resolve the						
	conflict						
44	No STCA coverage	ER31B31	ATCO responsible for the aircraft does not have short-term conflict	1; 3;	18; 19; 20; 21; 25	27; 31; 32; 33; 34; 35;	47; 48; 50; 51
			alert (STCA) installed, or it does not cover the location of the conflict			39;	54; 55; 56; 57 60; 61; 62; 63
45	STCA fails to give warning in time	ER31B32	Failure of STCA to alert ATCO to a conflict	1; 3;	18; 19; 20; 21; 25	27; 31; 32; 33; 34; 35;	47; 48; 50; 51
	or contains to give warning in time	L1131332	rundre of starte dieterries to a commet	2, 3,	10, 13, 20, 21, 23	39;	54; 55; 56; 57
							60; 61; 62; 63
46	ATCO fails to respond to STCA warning	ER31B33	Failure of ATCO to respond to the STCA warning	1; 3;	18; 19; 20; 21; 25	27; 31; 32; 33; 34; 35;	47; 48; 50; 51
				1		39;	54; 55; 56; 57
47	ATCO fella ta managaria in	ER31B34	ATCO responds to an STCA warning but fails to make effective	4. 2.	18; 19; 20; 21; 25	27; 31; 32; 33; 34; 35;	60; 61; 62; 63
4/	ATCO fails to recover separation in time	EK31B34	resolving action in time	1; 3;	18; 19; 20; 21; 25	39;	47; 48; 50; 51 54; 55; 56; 57
	ume		resolving action in time			33,	60; 61; 62; 63
18	No independent ATCO monitoring	ER31B41	No other ATCO is monitoring the aircraft's trajectory independently	1; 3;	18; 19; 20; 21; 25	27; 31; 32; 33; 34; 35;	47; 48; 50; 51
						39;	54; 55; 56; 57
							60; 61; 62; 63
49	Other ATCOs fail to detect conflict	ER31B42	Other ATCOs monitoring the aircraft's trajectory fails to recognise	1; 3;	18; 19; 20; 21; 25	27; 31; 32; 33; 34; 35;	47; 48; 50; 51
			the conflict			39;	54; 55; 56; 57 60; 61; 62; 63
50	ATCOs fail to communicate warning	ER31B43	Other ATCOs recognise the conflict but fails to communicate with	1; 3;	18; 19; 20; 21; 25	27; 31; 32; 33; 34; 35;	47; 48; 50; 51
50	Areos fail to communicate warning	ENSIB43	the ATCO concerned	1, 3,	10, 13, 20, 21, 23	39;	54; 55; 56; 57
						,	60; 61; 62; 63
51	ATCO fails to recover separation in	ER31B44	ATCO is informed by other ATCO of a conflict but fails to resolve it	1; 3;	18; 19; 20; 21; 25	27; 31; 32; 33; 34; 35;	47; 48; 50; 51
	time		in time			39;	54; 55; 56; 57
	Flinks faile to detect and						60; 61; 62; 63
Ш	Flight crew fails to detect and resolve conflict						
52	ACAS not installed	ER31B21	Airborne collision avoidance system (ACAS) is not installed on board	1; 3;	18; 19; 20; 21; 25	27; 31; 32; 33; 34; 35;	47; 48; 50; 51
			the aircraft			39;	54; 55; 56; 57
							60; 61; 62; 63
53	ACAS fails to give RA in time	ER31B22	ACAS fails to give the pilot a resolution advisory (RA) in time to	1; 3;	18; 19; 20; 21; 25	27; 31; 32; 33; 34; 35;	47; 48; 50; 51
			resolve a conflict			39;	54; 55; 56; 57
54	Pilot fails to respond to RA in time	ER31B23	An RA is given but the pilot fails to respond in time to resolve the	1; 3;	18; 19; 20; 21; 25	27; 31; 32; 33; 34; 35;	60; 61; 62; 63 47; 48; 50; 51
• •			conflict	' - '	5,, -5, -1, -5	39;	54; 55; 56; 57
			- I	1	1	1.	60; 61; 62; 63
55	ACAS avoidance invalidated by other	ER31B24	ACAS avoidance action is cancelled out by incorrect action from the	1; 3;	18; 19; 20; 21; 25	27; 31; 32; 33; 34; 35;	47; 48; 50; 51
55	ACAS avoidance invalidated by other aircraft	ER31B24	ACAS avoidance action is cancelled out by incorrect action from the other aircraft	1; 3;	18; 19; 20; 21; 25	27; 31; 32; 33; 34; 35; 39;	47; 48; 50; 51 54; 55; 56; 57
	aircraft		other aircraft			39;	47; 48; 50; 51 54; 55; 56; 57 60; 61; 62; 63
		ER31B24 ER31B111		1; 3;	18; 19; 20; 21; 25 18; 19; 20; 21; 25	39; 27; 31; 32; 33; 34; 35;	47; 48; 50; 51 54; 55; 56; 57 60; 61; 62; 63 47; 48; 50; 51
	aircraft		other aircraft			39;	47; 48; 50; 51 54; 55; 56; 57 60; 61; 62; 63 47; 48; 50; 51 54; 55; 56; 57
56	aircraft		other aircraft			39; 27; 31; 32; 33; 34; 35;	47; 48; 50; 51 54; 55; 56; 57 60; 61; 62; 63 47; 48; 50; 51 54; 55; 56; 57 60; 61; 62; 63
56	aircraft Other aircraft effectively invisible	ER31B111	other aircraft The other aircraft cannot be seen from the cockpit	1; 3;	18; 19; 20; 21; 25	39; 27; 31; 32; 33; 34; 35; 39;	47; 48; 50; 51 54; 55; 56; 57 60; 61; 62; 63 47; 48; 50; 51 54; 55; 56; 57 60; 61; 62; 63 47; 48; 50; 51 54; 55; 56; 57
56 57	aircraft Other aircraft effectively invisible Flight crew fail to observe visible aircraft in time	ER31B111 ER31B112	other aircraft The other aircraft cannot be seen from the cockpit Pilots fail to observe visible aircraft in time to make avoidance action	1; 3;	18; 19; 20; 21; 25 18; 19; 20; 21; 25	39; 27; 31; 32; 33; 34; 35; 39; 27; 31; 32; 33; 34; 35; 39;	47; 48; 50; 51 54; 55; 56; 57 60; 61; 62; 63 47; 48; 50; 51 54; 55; 56; 57 60; 61; 62; 63 47; 48; 50; 51 54; 55; 56; 57 60; 61; 62; 63
56 57	aircraft Other aircraft effectively invisible Flight crew fail to observe visible aircraft in time Pilot fails to take avoidance action in	ER31B111	other aircraft The other aircraft cannot be seen from the cockpit Pilots fail to observe visible aircraft in time to make avoidance action Pilots fail to make appropriate avoidance action, having observed	1; 3;	18; 19; 20; 21; 25	39; 27; 31; 32; 33; 34; 35; 39; 27; 31; 32; 33; 34; 35; 39; 27; 31; 32; 33; 34; 35;	47; 48; 50; 51 54; 55; 56; 57 60; 61; 62; 63 47; 48; 50; 51 54; 55; 56; 57 60; 61; 62; 63 47; 48; 50; 51 54; 55; 56; 57 60; 61; 62; 63 47; 48; 50; 51
56 57	aircraft Other aircraft effectively invisible Flight crew fail to observe visible aircraft in time	ER31B111 ER31B112	other aircraft The other aircraft cannot be seen from the cockpit Pilots fail to observe visible aircraft in time to make avoidance action	1; 3;	18; 19; 20; 21; 25 18; 19; 20; 21; 25	39; 27; 31; 32; 33; 34; 35; 39; 27; 31; 32; 33; 34; 35; 39;	47; 48; 50; 51 54; 55; 56; 57 60; 61; 62; 63 47; 48; 50; 51 54; 55; 56; 57 60; 61; 62; 63 47; 48; 50; 51 54; 55; 56; 57 60; 61; 62; 63 47; 48; 50; 51 54; 55; 56; 57
56 57	aircraft Other aircraft effectively invisible Flight crew fail to observe visible aircraft in time Pilot fails to take avoidance action in	ER31B111 ER31B112	other aircraft The other aircraft cannot be seen from the cockpit Pilots fail to observe visible aircraft in time to make avoidance action Pilots fail to make appropriate avoidance action, having observed the other aircraft with sufficient time to take the necessary action	1; 3;	18; 19; 20; 21; 25 18; 19; 20; 21; 25 18; 19; 20; 21; 25	39; 27; 31; 32; 33; 34; 35; 39; 27; 31; 32; 33; 34; 35; 39; 27; 31; 32; 33; 34; 35;	47; 48; 50; 51 54; 55; 56; 57 60; 61; 62; 63 47; 48; 50; 51 54; 55; 56; 57 60; 61; 62; 63 47; 48; 50; 51 54; 55; 56; 57 60; 61; 62; 63 47; 48; 50; 51 54; 55; 56; 57 60; 61; 62; 63
56 57	aircraft Other aircraft effectively invisible Flight crew fail to observe visible aircraft in time Pilot fails to take avoidance action in time	ER31B111 ER31B112 ER31B113	other aircraft The other aircraft cannot be seen from the cockpit Pilots fail to observe visible aircraft in time to make avoidance action Pilots fail to make appropriate avoidance action, having observed the other aircraft with sufficient time to take the necessary action	1; 3;	18; 19; 20; 21; 25 18; 19; 20; 21; 25	39; 27; 31; 32; 33; 34; 35; 39; 27; 31; 32; 33; 34; 35; 39; 27; 31; 32; 33; 34; 35; 39;	47; 48; 50; 51 54; 55; 56; 57 60; 61; 62; 63 47; 48; 50; 51 54; 55; 56; 57 60; 61; 62; 63 47; 48; 50; 51 54; 55; 56; 57 60; 61; 62; 63 47; 48; 50; 51 54; 55; 56; 57 60; 61; 62; 63 47; 48; 50; 51
56 57	aircraft Other aircraft effectively invisible Flight crew fail to observe visible aircraft in time Pilot fails to take avoidance action in time Visual avoidance invalidated by other	ER31B111 ER31B112 ER31B113 ER31B114	other aircraft The other aircraft cannot be seen from the cockpit Pilots fail to observe visible aircraft in time to make avoidance action Pilots fail to make appropriate avoidance action, having observed the other aircraft with sufficient time to take the necessary action Pilot's response is cancelled out by opposing manoeuvre from the	1; 3;	18; 19; 20; 21; 25 18; 19; 20; 21; 25 18; 19; 20; 21; 25 18; 19; 20; 21; 25	39; 27; 31; 32; 33; 34; 35; 39; 27; 31; 32; 33; 34; 35; 39; 27; 31; 32; 33; 34; 35; 39; 27; 31; 32; 33; 34; 35;	47; 48; 50; 51 54; 55; 56; 57 60; 61; 62; 63 47; 48; 50; 51, 54; 55; 56; 57, 60; 61; 62; 63 47; 48; 50; 51, 54; 55; 56; 57, 60; 61; 62; 63 47; 48; 50; 51, 54; 55; 56; 57, 60; 61; 62; 63 47; 48; 50; 51, 54; 55; 56; 57,
56 57 58	aircraft Other aircraft effectively invisible Flight crew fail to observe visible aircraft in time Pilot fails to take avoidance action in time Visual avoidance invalidated by other aircraft Ineffective visual warning on other	ER31B111 ER31B112 ER31B113	other aircraft The other aircraft cannot be seen from the cockpit Pilots fail to observe visible aircraft in time to make avoidance action Pilots fail to make appropriate avoidance action, having observed the other aircraft with sufficient time to take the necessary action Pilot's response is cancelled out by opposing manoeuvre from the other aircraft Pilots on the conflicting aircraft fail to resolve the conflict using see	1; 3; 1; 3; 1; 3; 1; 3;	18; 19; 20; 21; 25 18; 19; 20; 21; 25 18; 19; 20; 21; 25	39; 27; 31; 32; 33; 34; 35; 39; 27; 31; 32; 33; 34; 35; 39; 27; 31; 32; 33; 34; 35; 39; 27; 31; 32; 33; 34; 35; 39; 27; 31; 32; 33; 34; 35;	47; 48; 50; 51 54; 55; 56; 57, 60; 61; 62; 63 47; 48; 50; 51, 54; 55; 56; 57, 60; 61; 62; 63 47; 48; 50; 51, 54; 55; 56; 57, 60; 61; 62; 63 47; 48; 50; 51, 54; 55; 56; 57, 60; 61; 62; 63 47; 48; 50; 51, 54; 55; 56; 57, 60; 61; 62; 63 47; 48; 50; 51, 54; 55; 56; 57, 60; 61; 62; 63 47; 48; 50; 51,
56 57 58	aircraft Other aircraft effectively invisible Flight crew fail to observe visible aircraft in time Pilot fails to take avoidance action in time Visual avoidance invalidated by other aircraft	ER31B111 ER31B112 ER31B113 ER31B114	other aircraft The other aircraft cannot be seen from the cockpit Pilots fail to observe visible aircraft in time to make avoidance action Pilots fail to make appropriate avoidance action, having observed the other aircraft with sufficient time to take the necessary action Pilot's response is cancelled out by opposing manoeuvre from the other aircraft	1; 3; 1; 3; 1; 3; 1; 3;	18; 19; 20; 21; 25 18; 19; 20; 21; 25 18; 19; 20; 21; 25 18; 19; 20; 21; 25	39; 27; 31; 32; 33; 34; 35; 39; 27; 31; 32; 33; 34; 35; 39; 27; 31; 32; 33; 34; 35; 39; 27; 31; 32; 33; 34; 35; 39;	47; 48; 50; 51 54; 55; 56; 57 60; 61; 62; 63 47; 48; 50; 51 54; 55; 56; 57 60; 61; 62; 63 47; 48; 50; 51 54; 55; 56; 57 60; 61; 62; 63 47; 48; 50; 51 54; 55; 56; 57 60; 61; 62; 63 47; 48; 50; 51 54; 55; 56; 57 60; 61; 62; 63 47; 48; 50; 51 54; 55; 56; 57 60; 61; 62; 63 47; 48; 50; 51 54; 55; 56; 57 60; 61; 62; 63 47; 48; 50; 51 54; 55; 56; 57
56 57 58	aircraft Other aircraft effectively invisible Flight crew fail to observe visible aircraft in time Pilot fails to take avoidance action in time Visual avoidance invalidated by other aircraft Ineffective visual warning on other aircraft	ER31B111 ER31B112 ER31B113 ER31B114 ER31B12	other aircraft The other aircraft cannot be seen from the cockpit Pilots fail to observe visible aircraft in time to make avoidance action Pilots fail to make appropriate avoidance action, having observed the other aircraft with sufficient time to take the necessary action Pilot's response is cancelled out by opposing manoeuvre from the other aircraft Pilots on the conflicting aircraft fail to resolve the conflict using see & avoid techniques, given similar failure on the subject aircraft	1; 3; 1; 3; 1; 3; 1; 3;	18; 19; 20; 21; 25 18; 19; 20; 21; 25 18; 19; 20; 21; 25 18; 19; 20; 21; 25 18; 19; 20; 21; 25	39; 27; 31; 32; 33; 34; 35; 39; 27; 31; 32; 33; 34; 35; 39; 27; 31; 32; 33; 34; 35; 39; 27; 31; 32; 33; 34; 35; 39; 27; 31; 32; 33; 34; 35; 39;	47; 48; 50; 51 54; 55; 56; 57; 60; 61; 62; 63 47; 48; 50; 51; 54; 55; 56; 57; 60; 61; 62; 63 47; 48; 50; 51; 54; 55; 56; 57; 60; 61; 62; 63 47; 48; 50; 51; 54; 55; 56; 57; 60; 61; 62; 63 47; 48; 50; 51; 54; 55; 56; 57; 60; 61; 62; 63 47; 48; 50; 51; 54; 55; 56; 57; 60; 61; 62; 63 63; 63; 63; 63; 63; 63; 63; 63; 63; 63;
56 57 58	aircraft Other aircraft effectively invisible Flight crew fail to observe visible aircraft in time Pilot fails to take avoidance action in time Visual avoidance invalidated by other aircraft Ineffective visual warning on other	ER31B111 ER31B112 ER31B113 ER31B114	other aircraft The other aircraft cannot be seen from the cockpit Pilots fail to observe visible aircraft in time to make avoidance action Pilots fail to make appropriate avoidance action, having observed the other aircraft with sufficient time to take the necessary action Pilot's response is cancelled out by opposing manoeuvre from the other aircraft Pilots on the conflicting aircraft fail to resolve the conflict using see	1; 3; 1; 3; 1; 3; 1; 3;	18; 19; 20; 21; 25 18; 19; 20; 21; 25 18; 19; 20; 21; 25 18; 19; 20; 21; 25	39; 27; 31; 32; 33; 34; 35; 39; 27; 31; 32; 33; 34; 35; 39; 27; 31; 32; 33; 34; 35; 39; 27; 31; 32; 33; 34; 35; 39; 27; 31; 32; 33; 34; 35;	47; 48; 50; 51; 54; 55; 56; 57; 60; 61; 62; 63 47; 48; 50; 51; 54; 55; 56; 57; 60; 61; 62; 63 47; 48; 50; 51; 54; 55; 56; 57; 60; 61; 62; 63



	Base events	Code	Definition	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
ESD 19	Base events	Code	Definition	Technology	Human	Organisation	System of
							Organisations
	Unstable Approach Poor manual flight control causes UA	AL19B111	An input to the aircraft's flight controls by flight crew results in the		15; 16; 17; 20; 23; 24;	26; 27; 32; 34; 35; 36;	50; 51; 54; 55; 58; 59
-		71233211	approach becoming destabilised, such as high sink rate, deviate above or below the glide slope, speed too fast/ slow, or aircraft not		25	38; 39;	61; 62;
2	Check list failure	AL19B1121	aligned with the centre line to the runway Flight crew fail to conduct briefings and checklists, which leads to a		16; 17;	26; 28; 29; 30;	50; 51; 59; 61; 62;
3	Improper control exchange	AL19B1122	CRM failure An exchange of control of the aircraft occurs at an inappropriate		15; 16; 17; 19; 20; 23;	26; 27; 29; 30; 32; 34;	50; 51; 54; 55; 58; 59
	, , , , , , , , , , , , , , , , , , ,		time during the approach or following an exchange of control, the flight crew are unsure of their roles		24; 25	35; 36; 38; 39;	60; 62;
4	Poor automated systems management causes UA	AL19B113	Flight crew use the flight management system inappropriately. Flight management system includes the Autopilot and auto throttle systems among others		15; 16; 17; 19; 20; 23; 24; 25	26; 27; 32; 34; 35; 36; 38; 39; 40;	47; 50; 51; 54; 55; 58 59; 60; 62;
5	Loss of visual	AL19B121	Flight crew losses visual reference with the runway when not on an ILS approach		15; 16; 17; 19; 20; 23; 24; 25	26; 27; 32; 34; 35; 36; 38; 39;	47; 48; 50; 51; 52; 53 56; 57; 58; 59; 60; 62 63
6	Severe turbulence	AL19B122	Turbulence is so severe that no control input will stabilise the approach		16; 18; 19; 20; 21; 23;	26; 31; 34; 35; 36; 39;	48; 50; 51; 54; 55; 58 59; 60; 61; 62;
7	Crosswind exceeded	AL19B123	Crosswind component for the aircraft is exceeded and it becomes unsafe for the aircraft to land		14; 16; 17; 23;	26; 35; 36; 39; 42;	48; 50; 51; 52; 53; 54 55; 58; 59; 60; 61; 62
II	Flight crew fails to initiate and execute missed approach						
8	Flight crew fail to recognise unstable approach	AL19B211	Both pilot and co-pilot fail to recognise the symptoms of an unstable approach and hence a missed approach is not initiated		14; 15; 16; 17; 18; 19; 20; 21; 23; 24; 25	26; 27; 28; 29; 30; 31; 32; 34; 35; 36; 38; 39; 40; 42;	47; 48; 50; 51; 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
9	Crew fail to respond appropriately to unstable approach	AL19B212	Flight crew recognise the unstable approach but are not able to take appropriate action to initiate a missed approach				
10	AOA protection prevents MA	AL19B221	After initiating a missed approach, the AOA protection system		13; 14; 15; 16; 17; 18;	26; 27; 28; 29; 30; 31;	47; 48; 50; 51; 52; 53
			activates and prevents the flight crew from executing the missed approach. AOA prevention system activates when the nose of the aircraft is pulled up sharply and is designed to prevent the aircraft from stalling		19; 20; 21; 23; 24; 25	32; 34; 35; 36; 38; 39; 40; 41; 42;	54; 55; 56; 57; 58; 59 60; 61; 62; 63
11	PF fails to execute correctly	AL19B222	Flight crew initiate a missed approach but fail to take appropriate action to execute the missed approach		14; 15; 16; 17; 18; 19; 20; 21; 23; 24; 25	26; 27; 28; 29; 30; 31; 32; 34; 35; 36; 38; 39; 40; 42;	47; 48; 50; 51; 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
	Flight crew fails to maintain control						
12	Uncontrollable	AL19B31	No input to controls will allow the flight crew to maintain control of the aircraft after failing to initiate or execute a missed approach		13; 14; 15; 16; 17; 18; 19; 20; 21; 23; 24; 25	26; 27; 28; 29; 30; 31; 32; 34; 35; 36; 38; 39; 40; 41; 42;	47; 48; 50; 51; 52; 53 54; 55; 56; 57; 58; 59 60; 61; 62; 63
13	Lack of control	AL19B32	The pilot makes no attempt to control the aircraft after failing to initiate or execute a missed approach		13; 14; 15; 16; 17; 18; 19; 20; 21; 23; 24; 25	26; 27; 28; 29; 30; 31; 32; 34; 35; 36; 38; 39; 40; 41; 42;	47; 48; 50; 51; 52; 53 54; 55; 56; 57; 58; 59 60; 61; 62; 63
14	Incorrect Control	AL19B33	The pilot applies incorrect control to the aircraft, after failing to initiate or execute a missed approach. This can be due to improper training, stress and fatigue		13; 14; 15; 16; 17; 18; 19; 20; 21; 23; 24; 25	26; 27; 28; 29; 30; 31; 32; 34; 35; 36; 38; 39; 40; 41; 42;	47; 48; 50; 51; 52; 53 54; 55; 56; 57; 58; 59 60; 61; 62; 63
15	Insufficient control	AL19B34	The pilot applies correct measures after failing to initiate or execute a missed approach, but these are not enough to maintain control		13; 14; 15; 16; 17; 18; 19; 20; 21; 23; 24; 25	26; 27; 28; 29; 30; 31; 32; 34; 35; 36; 38; 39; 40; 41; 42;	47; 48; 50; 51; 52; 53 54; 55; 56; 57; 58; 59 60; 61; 62; 63
IV	Structural failure					40, 41, 42,	00, 61, 62, 63
16	Structure too weak	AL19B41	Landing gear/structure is too weak due to manufacturing defect, improper maintenance or improper design	7;	13; 14; 15; 16; 17; 18; 19; 20; 21; 23; 24; 25	26; 27; 28; 29; 30; 31; 32; 34; 35; 36; 38; 39;	47; 48; 50; 51; 52; 53 54; 55; 56; 57; 58; 59
17	Design load exceeded	AL19B42	Landing gear/structure is its designed strength but the excessive landing load causes failure		13; 14; 15; 16; 17; 18; 19; 20; 21; 23; 24; 25	40; 41; 42; 26; 27; 28; 29; 30; 31; 32; 34; 35; 36; 38; 39;	60; 61; 62; 63 47; 48; 50; 51; 52; 53 54; 55; 56; 57; 58; 59
			and any load causes former		13, 20, 21, 23, 21, 23	40; 41; 42;	60; 61; 62; 63
	Flight crew fail to maintain control Uncontrollable	AL19B51	No input to controls will allow the flight crew to maintain control of	7.	13, 14, 15, 16, 17, 19,	26; 27; 28; 29; 30; 31;	47; 48; 50; 51; 52; 53
10	Oncontrollable	ALISBSI	the aircraft after suffering structural failure caused by hard landing	7,	13; 14; 15; 16; 17; 18; 19; 20; 21; 23; 24; 25	32; 34; 35; 36; 38; 39; 40; 41; 42;	54; 55; 56; 57; 58; 59 60; 61; 62; 63
19	Lack of control	AL19B52	The pilot makes no attempt to control the aircraft after suffering structural failure caused by hard landing	7;		26; 27; 28; 29; 30; 31; 32; 34; 35; 36; 38; 39;	47; 48; 50; 51; 52; 53 54; 55; 56; 57; 58; 59
20	Incorrect Control	AL19B53	The pilot applies incorrect control to the aircraft after suffering	7;	13; 14; 15; 16; 17; 18;	40; 41; 42; 26; 27; 28; 29; 30; 31;	60; 61; 62; 63 47; 48; 50; 51; 52; 53
20	mediteet control	ALISUSS	structural failure caused by hard landing. This can be due to improper training, stress and fatigue	<i>'</i> ,	19; 20; 21; 23; 24; 25	32; 34; 35; 36; 38; 39; 40; 41; 42;	54; 55; 56; 57; 58; 59 60; 61; 62; 63
21	Insufficient control	AL19B54	The pilot applies correct measures after aircraft suffering structural	7;	13; 14; 15; 16; 17; 18;	26; 27; 28; 29; 30; 31;	47; 48; 50; 51; 52; 53
	Fellowski		failure caused by hard landing, but these are not enough to prevent aircraft leaving off the side of the runway		19; 20; 21; 23; 24; 25	32; 34; 35; 36; 38; 39; 40; 41; 42;	54; 55; 56; 57; 58; 59 60; 61; 62; 63
	Failure to achieve maximum braking Insufficient runway length	AL19B61	Runway can be too short under wet or icy runway conditions for		13; 14; 15; 16; 17; 18;	26; 27; 28; 29; 30; 31;	47; 48; 50; 51; 52; 53
22	insufficient runway length	AL19861	plane to stop even if touchdown is successful and brakes are applied and functioning.		19; 20; 21; 23; 24; 25	26; 27; 28; 29; 30; 31; 32; 34; 35; 36; 38; 39; 40; 41; 42;	54; 55; 56; 57; 58; 59 60; 61; 62; 63
23	Brakes not functioning correctly	AL19B62	Brakes are not giving maximum braking, i.e. because of improper maintenance and damages	7; 9;	13; 14; 15; 16; 17; 18; 19; 20; 21; 23; 24; 25	26; 27; 28; 29; 30; 31; 32; 34; 35; 36; 38; 39; 40; 41; 42;	47; 48; 50; 51; 52; 53 54; 55; 56; 57; 58; 59 60; 61; 62; 63
	Brakes not applied correctly	AL19B63	Flight crew's failure to arm spoilers during the approach or apply on touchdown, failure in CRM leading to brakes not being applied, failure to apply brakes soon after touchdown, disengaging brakes during landing roll		13; 14; 15; 16; 17; 18; 19; 20; 21; 23; 24; 25	26; 27; 28; 29; 30; 31; 32; 34; 35; 36; 38; 39; 40; 41; 42;	47; 48; 50; 51; 52; 53 54; 55; 56; 57; 58; 59 60; 61; 62; 63
	Flight crew fail to maintain control Uncontrollable	AL19B71	No input to controls will allow the flight crew to maintain control of the aircraft after executing a missed approach		14; 15; 16; 17; 18; 19; 20; 21; 23; 24; 25	26; 27; 28; 29; 30; 31; 32; 34; 35; 36; 38; 39; 40; 42;	47; 48; 50; 51; 52; 53 54; 55; 56; 57; 58; 59 60; 61; 62; 63
26	Lack of control	AL19B72	The pilot makes no attempt to control the aircraft after executing a missed approach		14; 15; 16; 17; 18; 19; 20; 21; 23; 24; 25	26; 27; 28; 29; 30; 31; 32; 34; 35; 36; 38; 39; 40; 42;	47; 48; 50; 51; 52; 53 54; 55; 56; 57; 58; 59 60; 61; 62; 63
27	Incorrect Control	AL19B73	The pilot applies incorrect control to the aircraft after executing a missed approach. This can be due to improper training, stress and fatigue		14; 15; 16; 17; 18; 19; 20; 21; 23; 24; 25	26; 27; 28; 29; 30; 31; 32; 34; 35; 36; 38; 39; 40; 42;	47; 48; 50; 51; 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63



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28	Insufficient control	AL19B74	The pilot applies correct measures after executing a missed	14; 15; 16; 17; 18; 19;	26; 27; 28; 29; 30; 31;	47; 48; 50; 51; 52; 53;
			approach but are not enough to prevent aircraft leaving off the side	20; 21; 23; 24; 25	32; 34; 35; 36; 38; 39;	54; 55; 56; 57; 58; 59;
			of the runway		40; 42;	60; 61; 62; 63
VIII	Insufficient fuel available for next					
	approach					
29	Flight crew fail to notify ATC of	AL19B811	Flight crew do not inform the ATC that the fuel reserve is not	14; 15; 16; 17; 18; 19;	26; 27; 28; 29; 30; 31;	47; 48; 50; 51; 52; 53;
	inadequate reserves		sufficient for aircraft to perform the next approach	20; 21; 23; 24; 25	32; 34; 35; 36; 38; 39;	54; 55; 56; 57; 58; 59;
					40; 42;	60; 61; 62; 63
30	Poor flight planning	AL19B8121	Inadequate amount of reserved fuel in aircraft due to poor flight	14; 15; 16; 17; 18; 19;	26; 27; 28; 29; 30; 31;	47; 48; 50; 51; 52; 53;
			planning	20; 21; 23; 24; 25	32; 34; 35; 36; 38; 39;	54; 55; 56; 57; 58; 59;
					40; 42;	60; 61; 62; 63
31	Aircraft diverted from other location	AL19B8122	Aircraft consumes extra fuel during flight due to a route diversion	14; 15; 16; 17; 18; 19;	26; 27; 28; 29; 30; 31;	47; 48; 50; 51; 52; 53;
				20; 21; 23; 24; 25	32; 34; 35; 36; 38; 39;	54; 55; 56; 57; 58; 59;
					40; 42;	60; 61; 62; 63
32	Aircraft executes multiple MA	AL19B82	Aircraft has already performed one or more missed approach	14; 15; 16; 17; 18; 19;	26; 27; 28; 29; 30; 31;	47; 48; 50; 51; 52; 53;
			previously, and hence the reserved fuel is not sufficient to perform	20; 21; 23; 24; 25	32; 34; 35; 36; 38; 39;	54; 55; 56; 57; 58; 59;
			the next approach		40; 42;	60; 61; 62; 63



	Base events	Code	Definition	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	Base events	Code	Definition	Technology	Human	Organisation	System of
				ű,		ŭ	Organisations
	Aircraft System Failure	T004044		4.2.0	40.40.04.00	24.44	50 54 54 55 50 50
	Autoflight Failure	TO01B11 TO01B12	Failure of any of the systems associated with the autopilot and auto throttle	1; 3; 9;	13; 18; 21; 22; 11; 18; 19; 20; 21; 22;	31; 41;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63
2	Communications Failure	1001812	Failure of any communications equipment such that the crew are unable to communicate with ATC		11; 18; 19; 20; 21; 22;	31; 32; 33; 43;	45; 47; 50; 51; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
3	Electrical Power Failure	TO01B13	Failure of any of the power supplies such that any critical system fails	1; 2; 3; 8;	13; 14; 15; 19; 20; 22;	32; 33; 34; 35;	47; 50; 51; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
4	Fire Protection Failure	TO01B14	Failure of the system designed to warn of and extinguish any fire within the aircraft.		13; 14; 22;	41; 42;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63
5	Hydraulic Power Failure	TO01B15	Failure of any of the hydraulic systems	3; 5; 7;	13; 14; 22;	41; 42;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63
	Indicating and Recording System Failure	TO01B16	Failure of any of the flight instruments critical for safe flight	3;	13; 14; 22;	41; 42;	47; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
7	Navigation System Failure	TO01B17	Failure of any of the navigation systems	8;	15; 18; 19; 20; 21;	31; 32; 33; 34; 35; 36; 37; 38; 39;	47; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
8	Auxiliary Power Unit Failure	TO01B18	Failure of a critical part of the APU leading to failure of the APU itself	2;			50; 51; 54; 55; 58; 59; 60; 61; 62; 63
9	Flap Systems Failure	TO01B19	Failure of flap systems	3; 5;	13; 14; 22;	36; 37; 38; 39; 41; 42;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63
10	Drag Control Systems Failure	TO01B110	Failure of drag control systems	3;	13; 14; 22; 24;	28; 41; 42;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63
11	Landing Gear Systems Failure	TO01B111	Failure of landing gear systems	7;	23;	26; 29;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63
12	Pneumatic Systems Failure	TO01B112	Failure of pneumatic systems	3; 9;	13; 21;	41;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63
13	Door Systems Failure	TO01B113	Failure of door systems		18; 21;	31; 32; 33; 34; 35;	47; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
14	Other Systems Failures	TO01B114	Failure of other systems that may cause take-off rejection	4; 6;	22;		50; 51; 54; 55; 58; 59; 60; 61; 62; 63
	Take-off Rejection by Flight Crew						
15	Pilot Misdiagnosis	TO01B211	The pilot either fails to realise the failure or diagnoses the failure as something else, perhaps more serious and as a result aborts the take-off	1; 2; 3; 4; 5; 6; 7; 8; 9;	11; 13; 14; 15; 18; 19; 20; 21; 22; 23; 24;	26; 28; 29; 31; 32; 33; 34; 35; 36; 37; 38; 39; 41; 42; 43;	45; 47; 50; 51; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
16	Pilot Misjudgement	TO01B212	The pilot diagnoses the aircraft system failure but misjudges the situation and incorrectly aborts the take-off	1; 2; 3; 4; 5; 6; 7; 8; 9;	11; 13; 14; 15; 18; 19; 20; 21; 22; 23; 24;	26; 28; 29; 31; 32; 33; 34; 35; 36; 37; 38; 39; 41; 42; 43;	45; 47; 50; 51; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
	Take-off rejected correctly when below V1	TO01B22	If the take-off is rejected when the aircraft is below V1 then this is a success, but it must be included to obtain the pivotal event probability	1; 2; 3; 4; 5; 6; 7; 8; 9;	11; 13; 14; 15; 18; 19; 20; 21; 22; 23; 24;	26; 28; 29; 31; 32; 33; 34; 35; 36; 37; 38; 39; 41; 42; 43;	45; 47; 50; 51; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
	Failure to Achieve Maximum Braking Insufficient Runway Length	TO01B31	The runway can be too short under wet or icy runway conditions for	1. 7. 2. 4. 5. 6. 7. 9. 0.	11; 13; 14; 15; 18; 19;	26; 28; 29; 31; 32; 33;	45; 47; 50; 51; 54; 55;
18	Insumicient Runway Length	1001831	the plane to come to a halt even if the take-off is aborted before V1 is reached	1; 2; 3; 4; 5; 6; 7; 8; 9;	20; 21; 22; 23; 24;	26; 28; 29; 31; 32; 33; 34; 35; 36; 37; 38; 39; 41; 42; 43;	56; 57; 58; 59; 60; 61; 62; 63
19	Brakes not functioning correctly	TO01B32	The braking systems are improperly maintained or damaged during the take-off roll	1; 2; 3; 4; 5; 6; 7; 8; 9;	11; 13; 14; 15; 18; 19; 20; 21; 22; 23; 24;	26; 28; 29; 31; 32; 33; 34; 35; 36; 37; 38; 39; 41; 42; 43;	45; 47; 50; 51; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
20	Brakes not applied correctly	TO01B33	Failure of the flight crew to apply all the braking systems immediately after take-off rejection	1; 2; 3; 4; 5; 6; 7; 8; 9;	11; 13; 14; 15; 18; 19; 20; 21; 22; 23; 24;	26; 28; 29; 30; 31; 32; 33; 34; 35; 36; 37; 38; 39; 41; 42; 43;	45; 47; 50; 51; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
ESD 2	Base events	Code	Definition	Technology	Human	Organisation	System of Organisations
	Air Traffic related event	T000004444			44.00.00	22 22 24 25 42	47 40 50 54 54 55
1	Take-off instruction error by ATCO	TO02B11111	Inadequate take-off instruction is given by the Air Traffic Control Officer (ATCO) which causes a potential hazardous encounter		14; 20; 22;	32; 33; 34; 35; 42;	47; 48; 50; 51; 54; 55; 56; 57; 59; 60; 61; 62; 63
2	Inadequate communication with pilot	TO02B11112	Ineffective communication between ATCO and flight crew that leads to misunderstanding, and which causes a potential hazardous encounter		11; 14; 20; 22;	32; 33; 34; 35; 42; 43; 44	45; 47; 48; 50; 51; 54; 55; 56; 57; 59; 60; 61; 62; 63
	Pilot failure to follow take-off instructions	TO02B1112	Flight crew fails to carry out the instruction given by ATCO and which causes a potential hazardous encounter		11; 19; 20; 22;	32; 33; 34; 35; 43; 44	45; 47; 50; 51; 54; 55; 56; 57; 59; 60; 61; 62; 63
	Separation Infringement with Departing Aircraft caused by other a/c	TO02B11211	Aircraft loses separation with an aircraft departing which is caused by the other aircraft		11; 19; 22;	32; 34; 43; 44	45; 50; 51; 54; 55; 56; 57; 59; 60; 61; 62; 63
5	Separation Infringement with Landing	TO02B11212	Aircraft loses separation with an aircraft landing which is caused by		11; 19; 20; 22; 23;	32; 33; 34; 43; 44	45; 47; 50; 51; 54; 55; 56; 57; 59; 60; 61; 62;
	Aircraft caused by other a/c		the other aircraft				
6	Separation Infringement with a/c on	TO02B11213	Aircraft loses separation with an aircraft performing a missed		19; 20; 22; 23;	32; 34; 44	63 47; 50; 51; 54; 55; 56;
6 7	Separation Infringement with a/c on missed approach Separation Infringement with	TO02B11213 TO02B11214	Aircraft loses separation with an aircraft performing a missed approach Aircraft loses separation with an aircraft departing which is caused		19; 20; 22; 23; 11; 19; 22;	32; 34; 44 32; 34; 43; 44	47; 50; 51; 54; 55; 56; 57; 59; 60; 61; 62; 63 45; 50; 51; 54; 55; 56;
6 7	Separation Infringement with a/c on missed approach Separation Infringement with departing a/c caused by aircraft taking off	TO02B11214	Aircraft loses separation with an aircraft performing a missed approach Aircraft loses separation with an aircraft departing which is caused by the aircraft preparing to take-off		11; 19; 22;	32; 34; 43; 44	47; 50; 51; 54; 55; 56; 57; 59; 60; 61; 62; 63 45; 50; 51; 54; 55; 56; 57; 59; 60; 61; 62; 63
6 7 8	Separation Infringement with a/c on missed approach Separation Infringement with departing a/c caused by aircraft taking		Aircraft loses separation with an aircraft performing a missed approach Aircraft loses separation with an aircraft departing which is caused				47; 50; 51; 54; 55; 56; 57; 59; 60; 61; 62; 63 45; 50; 51; 54; 55; 56;
6 7 8	Separation Infringement with a/c on missed approach Separation Infringement with departing a/c caused by aircraft taking off Separation Infringement with landing a/c caused by aircraft taking off Illegal A/C infringement	TO02B11214 TO02B11215 TO02B11216	Aircraft loses separation with an aircraft performing a missed approach Aircraft loses separation with an aircraft departing which is caused by the aircraft preparing to take-off Aircraft loses separation with an aircraft landing which is caused by the aircraft preparing to take-off Aircraft deliberately infringes separation disregarding the instruction from ATC		11; 19; 22; 11; 19; 22; 23; 19; 22;	32; 34; 43; 44 32; 34; 43; 44 32; 34; 43; 44	47; 50; 51; 54; 55; 56; 57; 59; 60; 61; 62; 63 45; 50; 51; 54; 55; 56; 57; 59; 60; 61; 62; 63 45; 47; 50; 51; 54; 55; 56; 57; 59; 60; 61; 62; 63 45; 47; 50; 51; 59; 60; 61; 62; 63
6 7 8 9	Separation Infringement with a/c on missed approach Separation Infringement with departing a/c caused by aircraft taking off Separation Infringement with landing a/c caused by aircraft taking off Illegal A/C infringement	TO02B11214 TO02B11215 TO02B11216 TO02B1122	Aircraft loses separation with an aircraft performing a missed approach Aircraft loses separation with an aircraft departing which is caused by the aircraft preparing to take-off Aircraft loses separation with an aircraft landing which is caused by the aircraft preparing to take-off Aircraft deliberately infringes separation disregarding the instruction from ATC Traffic density above the airport is too high to allow the departing aircraft to take-off		11; 19; 22; 11; 19; 22; 23; 19; 22; 19; 20; 22;	32; 34; 43; 44 32; 34; 43; 44 32; 34; 43; 44 32; 33; 35;	47; 50; 51; 54; 55; 56; 57; 59; 60; 61; 62; 63 45; 50; 51; 54; 55; 56; 57; 59; 60; 61; 62; 63 45; 47; 50; 51; 54; 55; 56; 57; 59; 60; 61; 62; 63 45; 47; 50; 51; 59; 60; 61; 62; 63 45; 47; 50; 51; 59; 60; 61; 62; 63 47; 50; 51; 54; 55; 56; 57; 59; 60; 61; 62; 63
6 7 8 9 10	Separation Infringement with a/c on missed approach Separation Infringement with departing a/c caused by aircraft taking off Separation Infringement with landing a/c caused by aircraft taking off Illegal A/C infringement Traffic density too high Aircraft not ready to take-off	T002B11214 T002B11215 T002B11216 T002B1122 T002B1123	Aircraft loses separation with an aircraft performing a missed approach Aircraft loses separation with an aircraft departing which is caused by the aircraft preparing to take-off Aircraft loses separation with an aircraft landing which is caused by the aircraft preparing to take-off Aircraft deliberately infringes separation disregarding the instruction from ATC Traffic density above the airport is too high to allow the departing aircraft to take-off Flight crew are still preparing the aircraft for take-off when clearance is given resulting in the aircraft missing the allotted clearance slot		11; 19; 22; 11; 19; 22; 23; 19; 22; 19; 20; 22; 11; 19; 23;	32; 34; 43; 44 32; 34; 43; 44 32; 34; 43; 44 32; 33; 35; 32; 34; 43; 44	47; 50; 51; 54; 55; 56; 57; 59; 60; 61; 62; 63 45; 50; 51; 54; 55; 56; 57; 59; 60; 61; 62; 63 45; 47; 50; 51; 54; 55; 66; 65; 57; 59; 60; 61; 62; 63 45; 47; 50; 51; 59; 60; 61; 62; 63 47; 50; 51; 54; 55; 56; 57; 59; 60; 61; 62; 63 47; 50; 51; 54; 55; 56; 57; 59; 60; 61; 62; 63 45; 50; 51; 56; 57; 59; 60; 61; 62; 63
6 7 8 9 10 11	Separation Infringement with a/c on missed approach Separation Infringement with departing a/c caused by aircraft taking off Separation Infringement with landing a/c caused by aircraft taking off Illegal A/C infringement Traffic density too high Aircraft not ready to take-off Animals in vicinity of runway	TO02B11214 TO02B11215 TO02B11216 TO02B1122 TO02B1123 TO02B1124	Aircraft loses separation with an aircraft performing a missed approach Aircraft loses separation with an aircraft departing which is caused by the aircraft preparing to take-off Aircraft loses separation with an aircraft landing which is caused by the aircraft preparing to take-off Aircraft deliberately infringes separation disregarding the instruction from ATC Traffic density above the airport is too high to allow the departing aircraft to take-off Flight crew are still preparing the aircraft for take-off when clearance is given resulting in the aircraft missing the allotted clearance slot The presence of animal in the runway area and which may cause a collision hazard		11; 19; 22; 11; 19; 22; 23; 19; 22; 19; 20; 22; 11; 19; 23; 11; 22;	32; 34; 43; 44 32; 34; 43; 44 32; 34; 43; 44 32; 33; 35;	47; 50; 51; 54; 55; 56; 57; 59; 60; 61; 62; 63 45; 50; 51; 54; 55; 56; 57; 59; 60; 61; 62; 63 45; 47; 50; 51; 54; 55; 56; 57; 59; 60; 61; 62; 63 45; 47; 50; 51; 59; 60; 61; 62; 63 45; 47; 50; 51; 59; 60; 61; 62; 63 47; 50; 51; 54; 55; 56; 57; 59; 60; 61; 62; 63 45; 50; 51; 56; 57; 59; 60; 61; 62; 63 45; 49; 50; 51; 56; 57; 59; 60; 61; 62; 63 45; 49; 50; 51; 59; 60; 61; 62; 63
6 7 8 9 10 11 12	Separation Infringement with a/c on missed approach Separation Infringement with departing a/c caused by aircraft taking off Separation Infringement with landing a/c caused by aircraft taking off Illegal A/C infringement Traffic density too high Aircraft not ready to take-off	T002B11214 T002B11215 T002B11216 T002B1122 T002B1123	Aircraft loses separation with an aircraft performing a missed approach Aircraft loses separation with an aircraft departing which is caused by the aircraft preparing to take-off Aircraft loses separation with an aircraft landing which is caused by the aircraft preparing to take-off Aircraft deliberately infringes separation disregarding the instruction from ATC Traffic density above the airport is too high to allow the departing aircraft to take-off Flight crew are still preparing the aircraft for take-off when clearance is given resulting in the aircraft missing the allotted clearance slot The presence of animal in the runway area and which may cause a		11; 19; 22; 11; 19; 22; 23; 19; 22; 19; 20; 22; 11; 19; 23;	32; 34; 43; 44 32; 34; 43; 44 32; 34; 43; 44 32; 33; 35; 32; 34; 43; 44	47; 50; 51; 54; 55; 56; 57; 59; 60; 61; 62; 63 45; 50; 51; 54; 55; 56; 57; 59; 60; 61; 62; 63 45; 47; 50; 51; 54; 55; 56; 57; 59; 60; 61; 62; 63 45; 47; 50; 51; 54; 55; 56; 61; 62; 63 47; 50; 51; 54; 55; 55; 57; 59; 60; 61; 62; 63 47; 50; 51; 54; 55; 55; 57; 59; 60; 61; 62; 63 45; 50; 51; 56; 57; 59; 60; 61; 62; 63 45; 50; 51; 56; 57; 59; 60; 61; 62; 63



	Base events	Code	Definition	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	Pilot Misdiagnosis	TO02B211	The pilot fails to understand the air traffic situation and as a result	oris. recinology	11; 14; 19; 20; 22; 23;	32; 33; 34; 35; 42; 43;	45; 47; 48; 49; 50; 5
13	PHOLIMISUIAGHOSIS	10028211	aborts the take-off above V1		11, 14, 19, 20, 22, 23,	32, 33, 34, 33, 42, 43, 44	54; 55; 56; 57; 59; 6 61; 62; 63
16	Pilot Misjudgement	TO02B212	The pilot diagnoses the air traffic situation but misjudges the response and incorrectly aborts the take-off above V1		11; 14; 19; 20; 22; 23;	32; 33; 34; 35; 42; 43; 44	45; 47; 48; 49; 50; 5 54; 55; 56; 57; 59; 6 61; 62; 63
17	Take-off rejected correctly when below	TO02B22	If the take-off is rejected when the aircraft is below V1 then this is a		11; 14; 19; 20; 22; 23;	32; 33; 34; 35; 42; 43;	45; 47; 48; 49; 50;
	V1	1002822	success, but it must be included to obtain the pivotal event probability.		11, 14, 13, 20, 22, 23,	44	54; 55; 56; 57; 59; (61; 62; 63
III	Failure to achieve maximum braking						
18	Insufficient Runway Length	TO02B31	The runway is too short under wet or icy runway conditions for the plane to come to a halt even if the take-off is aborted before V1 is reached.		11; 14; 19; 20; 22; 23;	32; 33; 34; 35; 42; 43; 44	45; 47; 48; 49; 50; 54; 55; 56; 57; 59; 61; 62; 63
19	Brakes not functioning correctly	TO02B32	Brakes are not giving maximum braking, i.e. because of improper maintenance and damages	7; 9;	11; 14; 19; 20; 22; 23;	32; 33; 34; 35; 42; 43; 44	45; 47; 48; 49; 50; 54; 55; 56; 57; 59; 61; 62; 63
20	Brakes not applied correctly	TO02B33	Failure of the flight crew to apply all the braking systems immediately after take-off rejection.		11; 14; 19; 20; 22; 23;	28; 29; 30; 32; 33; 34; 35; 42; 43; 44	45; 47; 48; 49; 50; 54; 55; 56; 57; 59; 61; 62; 63
	Base events	Code	Definition	Technology	Human	Organisation	System of Organisations
	Inappropriate handling by flight crew Unsuccessful handling due to lack of	TO03B111	Untrained pilot flying (PF) handling take-offs with one engine	9;	22;		50; 51; 54; 55; 58;
	training		inoperative on four engine aircraft.	,			60; 61; 62; 63
2	Unsuccessful Handling	TO03B112	The pilot flying (PF) applies inappropriate handling that affects the directional stability of the aircraft during the take-off roll.		22;		50; 51; 54; 55; 58; 60; 61; 62; 63
3	Adverse Weather Conditions	TO03B12	The prevailing weather conditions affect the directional stability of		22;		48; 50; 51; 52; 53;
			the aircraft during the take-off roll. The weather conditions that can cause this failure including strong winds and slippery runway conditions.				55; 58; 59; 60; 61; 63
	Take-off Rejection						
4	Pilot Misdiagnosis	TO03B211	The pilot either fails to realise the problem or diagnoses the problem as something else, perhaps more serious and as a result aborts the take-off.	9;	22;		48; 50; 51; 52; 53; 55; 58; 59; 60; 61; 63
5	Pilot Misjudgement	TO03B212	The pilot diagnoses the correct aircraft system failure but misjudges the situation and incorrectly aborts the take-off.	9;	22;		48; 50; 51; 52; 53; 55; 58; 59; 60; 61; 63
	Take-off rejected correctly when below V1	TO03B22	If the take-off is rejected when the aircraft is below V1 then this is a success, but it must be included to obtain the pivotal event probability.	9;	22;		48; 50; 51; 52; 53; 55; 58; 59; 60; 61; 63
III	Failure to maintain control (V <= V1)						
7	Uncontrollable	TO03B31	No input to controls will allow the pilot to maintain control of the aircraft with speed less than V1	9;	22;		48; 50; 51; 52; 53; 55; 58; 59; 60; 61; 63
8	Lack of control	TO03B32	The pilot makes no attempt to control the aircraft with speed less than V1	9;	22;		48; 50; 51; 52; 53; 55; 58; 59; 60; 61; 63
9	Incorrect Control	TO03B33	The pilot applies incorrect control to the aircraft, which has speed less than V1. This can be due to improper training, stress and fatigue	9;	22;		48; 50; 51; 52; 53; 55; 58; 59; 60; 61; 63
10	Insufficient control	TO03B34	The pilot applies correct measures but are not enough to prevent aircraft leaving off the side of the runway	9;	22;		48; 50; 51; 52; 53; 55; 58; 59; 60; 61; 63
	Failure to Achieve Maximum Braking						
11	Insufficient Runway Length	TO03B41	The runway is too short under wet or icy runway conditions for the plane to come to a halt even if the take-off is aborted before V1 is reached.	9;	22;		48; 50; 51; 52; 53; 55; 58; 59; 60; 61; 63
12	Brakes not functioning correctly	TO03B42	Brakes are not giving maximum braking, i.e. because of improper maintenance and damages	7; 9;	22;		48; 50; 51; 52; 53; 55; 58; 59; 60; 61; 63
13	Brakes not applied correctly	TO03B43	Failure of the flight crew to apply all the braking systems immediately after take-off rejection.	9;	22;	28; 29; 30;	48; 50; 51; 52; 53; 55; 58; 59; 60; 61; 63
	Failure to maintain control						
14	Uncontrollable	TO03B51	No input to controls will allow the pilot to maintain control of the aircraft when take-off continued	9;	22;		48; 50; 51; 52; 53; 55; 58; 59; 60; 61; 63
15	Lack of control	TO03B52	The pilot makes no attempt to control the aircraft when take-off continued	9;	22;		48; 50; 51; 52; 53; 55; 58; 59; 60; 61; 63
16	Incorrect Control	TO03B53	The pilot applies incorrect control to the aircraft when take-off continued. This can be due to improper training, stress and fatigue	9;	22;		48; 50; 51; 52; 53; 55; 58; 59; 60; 61; 63
17	Insufficient control	TO03B54	The pilot applies correct measures but are not enough to prevent aircraft leaving off the side of the runway	9;	22;		48; 50; 51; 52; 53; 55; 58; 59; 60; 61; 63
	Base events	Code	Definition	Technology	Human	Organisation	System of Organisations
	Directional control systems failure Main Gear Failure	TO04B111	Failure of any part of the main gear	7;			50; 51; 54; 55; 58;
1	Widin Geal Fallule		randic or any part of the main ged!		<u> </u>		60; 61; 62; 63
2	Nose Gear Failure	TO04B112	Failure of any part of the nose gear including the steering system	7;			50; 51; 54; 55; 58;
	Brake System Failure	TO04B121	Failure in any part of the brake system that results in asymmetric braking force being applied to the wheels and hence causes	7;			60; 61; 62; 63 50; 51; 54; 55; 58; 60; 61; 62; 63
3							
	Tyre Failure	TO04B122	directional instability Failure of a tyre, i.e. bursting or delamination	7;			50; 51; 54; 55; 58;
4	Tyre Failure Wheel Sub-Assembly Failure	TO04B122 TO04B123	directional instability	7; 7;			50; 51; 54; 55; 58; 60; 61; 62; 63 50; 51; 54; 55; 58; 60; 61; 62; 63



Base events	Code	Definition	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
6 Pilot Misdiagnosis	TO04B211	The pilot either fails to realise the directional control system failure is the cause of the handling problems or diagnoses the failure as something else, perhaps more serious and as a result aborts the take-off.				50; 51; 54; 55; 58; 59; 60; 61; 62; 63
7 Pilot Misjudgement	TO04B212	The pilot diagnoses the situation, realising that a directional control related system failure has resulted in handling problems but misjudges the situation and incorrectly aborts the take-off.	7;			50; 51; 54; 55; 58; 59; 60; 61; 62; 63
8 Take-off rejected correctly when below V1	w TO04B22	If the take-off is rejected when the aircraft is below V1 then this is a success, but it must be included to obtain the pivotal event probability.	7;			50; 51; 54; 55; 58; 59; 60; 61; 62; 63
III Failure to maintain control (take-off		, , ,				
rejected) 9 Uncontrollable	TO04B31	No input to controls will allow the pilot to maintain control of the	7;	+		50; 51; 54; 55; 58; 59;
		aircraft with speed less than V1				60; 61; 62; 63
10 Lack of control	TO04B32	The pilot makes no attempt to control the aircraft with speed less than V1	7;			50; 51; 54; 55; 58; 59; 60; 61; 62; 63
11 Incorrect Control	TO04B33	The pilot applies incorrect control to the aircraft, which has speed less than V1. This can be due to improper training, stress and fatigue	7;			50; 51; 54; 55; 58; 59; 60; 61; 62; 63
12 Insufficient control	TO04B34	The pilot applies correct measures but are not enough to prevent aircraft leaving off the side of the runway	7;			50; 51; 54; 55; 58; 59 60; 61; 62; 63
IV Failure to Achieve Maximum Braking (V <v1)< td=""><td></td><td></td><td></td><td></td><td></td><td></td></v1)<>						
13 Insufficient Runway Length	TO04B41	The runway is too short under wet or icy runway conditions for the	7;			50; 51; 54; 55; 58; 59;
		plane to come to a halt even if the take-off is aborted before V1 is reached.				60; 61; 62; 63
14 Brakes not functioning correctly	TO04B42	Brakes are not giving maximum braking, e.g. because of improper	7; 9;			50; 51; 54; 55; 58; 59;
15 Brakes not applied correctly	TO04B43	maintenance and damages Failure of the flight crew to apply all the braking systems	7;		28; 29; 30;	60; 61; 62; 63 50; 51; 54; 55; 58; 59;
		immediately after take-off rejection.	,		,, 50,	60; 61; 62; 63
V Failure to Maintain control (take-off continued)						
16 Uncontrollable	TO04B51	No input to controls will allow the pilot to maintain control of the	7;			50; 51; 54; 55; 58; 59;
17 Lack of Control	TO04B52	aircraft. The pilot makes no attempt to control the aircraft.	7;	+		60; 61; 62; 63 50; 51; 54; 55; 58; 59;
						60; 61; 62; 63
18 Incorrect Control	TO04B53	The pilot applies incorrect control to the aircraft. This can be due to improper training, stress and fatigue	7;			50; 51; 54; 55; 58; 59; 60; 61; 62; 63
19 Insufficient Control	TO04B54	The pilot applies correct measures but are not enough to prevent	7;			50; 51; 54; 55; 58; 59;
ESD 5 Base events	Code	aircraft leaving off the side of the runway Definition	Technology	Human	Organisation	60; 61; 62; 63 System of
			,		8	Organisations
I Incorrect configuration 1 Unsuccessful TO configuration checkli	st TO05B111	Co-pilot fails to determine the position of the flap and slats required		13; 22;	38; 41;	50; 51; 54; 55; 58; 59;
_		for a successful take-off				60; 61; 62; 63
2 Unsuccessful Checklist Verification	TO05B112	Captain fails to identify the incorrect position of the flap and slats determined by co-pilot		13; 22;	38; 41;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63
3 Flap & slat positions entered into FMC incorrectly	TO05B12	Co-pilot fails to enter the correct flap and slat settings into the FMC that the aircraft is incorrectly configured prior to push-back from		13; 22;	38; 41;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63
4 Verification not conducted	TO05B21	the stand Captain fails to perform the take-off configuration check prior to		13; 22;	38; 41;	50; 51; 54; 55; 58; 59;
. Varification consensed t	TO05B22	the application of take-off power		42. 22.	20. 44.	60; 61; 62; 63
5 Verification unsuccessful	1005822	Captain performs the take-off configuration check but fails to notice that the aircraft is configured incorrectly.		13; 22;	38; 41;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63
II Take-off configuration warning	TO05B311	TOOM and the faile date to the fact that the	2.	42. 22.	20.44	FO: F4: F4: FF: F0: F0
6 Unsuccessful Manufacture	10036311	TOCW system fails due to unsuccessful manufacture and hence the take-off is not rejected	3,	13; 22;	38; 41;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63
7 Unsuccessful Maintenance	TO05B312	TOCW system fails due to unsuccessful maintenance and hence the	3;	13; 22;	38; 41;	50; 51; 54; 55; 58; 59;
8 Unsuccessful Operation	TO05B313	take-off is not rejected TOCW system fails because the flight crew operate it incorrectly.		13; 22;	38; 41;	60; 61; 62; 63 50; 51; 54; 55; 58; 59;
		This includes the failure of the flight crew to check that the TOCW is working prior to taxi or the failure of the crew to reset the TOCW circuit breaker following testing				60; 61; 62; 63
9 Unsuccessful Manufacture	TO05B321	TOCW power supply fails due to unsuccessful manufacture and	2;	13; 22;	38; 41;	50; 51; 54; 55; 58; 59;
10 Unsuccessful Maintenance	TO05B322	hence the take-off is not rejected TOCW power supply fails due to unsuccessful maintenance and	2;	13; 22;	38; 41;	60; 61; 62; 63 50; 51; 54; 55; 58; 59;
		hence the take-off is not rejected	,			60; 61; 62; 63
11 Aircraft takes-off with incorrect configuration	TO05B33	Aircraft is still able to take-off even with the incorrect configuration		13; 22;	38; 41;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63
III Flight crew rejects take-off						
12 Pilot Misdiagnosis	TO05B411	The pilot misdiagnoses the situation and misunderstands the warning and allows the aircraft to reach V1 before incorrectly aborting the take-off		13; 22;	38; 41;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63
13 Pilot Misjudgement	T005B412	The pilot diagnoses the TOCW but misjudges the situation and allows the aircraft to reach V1 before incorrectly aborting the take-off		13; 22;	38; 41;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63
14 Take-off rejected correctly when below	w TO05B42	If the take-off is rejected when the aircraft is below V1 then this is a success, but it must be included to obtain the pivotal event		13; 22;	38; 41;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63
IV Failure to achieve maximum braking		probability.				
15 Insufficient Runway Length	TO05B51	The runway is too short under wet or icy runway conditions for the plane to come to a halt even if the take-off is aborted before V1 is reached.		13; 22;	38; 41;	48; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
16 Brakes not functioning correctly	TO05B52	reacned. Brakes are not giving maximum braking, e.g. because of improper maintenance and damages	7; 9;	13; 22;	38; 41;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63
17 Brakes not applied correctly	TO05B53	Failure of the flight crew to apply all the braking systems		13; 22;	28; 29; 30; 38; 41;	50; 51; 54; 55; 58; 59;
V Aircraft stalls after rotation		immediately after take-off rejection.				60; 61; 62; 63
18 Stall Unavoidable	TO05B61	No input to controls will allow the flight crew to avoid the stall	2; 3;	13; 22;	38; 41;	50; 51; 54; 55; 58; 59;
19 Pilot ignores stickshaker	TO05B622	Flight crew take no action to the activated stick-shaker	2; 3;	13; 22;	38; 41;	60; 61; 62; 63 50; 51; 54; 55; 58; 59;
not ignores stickshaker	. 5555622		-, -,	-5,,	30, 11,	60; 61; 62; 63



	Base events	Code Definition		SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations	
20	Stick shaker failure	TO05B6211	Stick-shaker fails due to improper manufacture or maintenance	2; 3;	13; 22;	38; 41;	50; 51; 54; 55; 58; 59	
21	Stall AOA too low	TO05B6212	Stall occurs at an AOA that is less than the AOA required to activate	2- 3- 6-	13; 22;	38; 41;	60; 61; 62; 63 48; 50; 51; 54; 55; 58	
		100300212	the stick-shaker	2, 3, 0,	13, 22,	30, 41,	59; 60; 61; 62; 63	
	Flight crew fails to regain control Uncontrollable	TO05B71	No input to controls will allow the flight crew to maintain control of	2; 3; 6;	13; 22;	38; 41;	48; 50; 51; 54; 55; 58	
			the aircraft.				59; 60; 61; 62; 63	
23	Lack of control	TO05B72	The pilot makes no attempt to control the aircraft.	2; 3; 6;	13; 22;	38; 41;	48; 50; 51; 54; 55; 5 59; 60; 61; 62; 63	
24	Incorrect Control	TO05B73	The pilot applies incorrect control to the aircraft. This can be due to	2; 3; 6;	13; 22;	38; 41;	48; 50; 51; 54; 55; 5	
25	Insufficient control	TO05B74	improper training, stress and fatigue The pilot applies correct measures but are not enough to prevent	2; 3; 6;	13; 22;	38; 41;	59; 60; 61; 62; 63 48; 50; 51; 54; 55; 5	
ECD 0	Base events	Code	aircraft leaving off the side of the runway Definition	Technology	Human	Organisation	59; 60; 61; 62; 63 System of	
		code	Definition	recimology	Tiuman	Organisation	Organisations	
	Single Engine Failure Unsuccessful Manufacturing	TO09B11	Manufacture failure of a part of the engine which creates an	9;	13; 18; 22;	31; 38; 41;	50; 51; 54; 55; 58; 5	
-	onsuccessia manatacaning	1003511	undetectable defect or a defect that is detectable by the manufacturers testing but not by maintenance testing	,	15, 10, 22,	31, 30, 11,	60; 61; 62; 63	
2	Unsuccessful Maintenance	TO09B12	Maintenance on the engine is not conducted or conducted	9;	13; 18; 22;	31; 38; 41;	50; 51; 54; 55; 58; 5	
			incorrectly, an incorrect modification is made or the manufacturer's guidelines are inadequate such that the maintenance performed is incorrect				60; 61; 62; 63	
	Unsuccessful Manufacture and	TO09B13	Engine is both unsuccessfully manufactured and where	9;	13; 18; 22;	31; 38; 41;	50; 51; 54; 55; 58; 5	
	Maintenance		maintenance fails to detect the defect that arise from manufacturing				60; 61; 62; 63	
4	Foreign Object Damage	TO09B14	Engine ingests objects such as debris left on the runway by other aircraft or it suffers a bird strike	9;	13; 18; 22;	31; 38; 41;	50; 51; 54; 55; 58; 5 60; 61; 62; 63	
	Flight crew rejects take-off Pilot Misdiagnosis	TO09B211	The pilot either misdiagnoses the situation or misunderstands the	9;	13; 18; 22;	31; 38; 41;	50; 51; 54; 55; 58; 5	
,	Thot Wisdiagnosis	10038211	effects caused by a single engine failure, and hence incorrectly aborts the take-off.	3,	13, 10, 22,	31, 30, 41,	60; 61; 62; 63	
6	Pilot Misjudgement	TO09B212	The flight crew diagnoses the engine failure but misjudges the situation and incorrectly aborts the take-off	9;	13; 18; 22;	31; 38; 41;	50; 51; 54; 55; 58; 5 60; 61; 62; 63	
	Take-off rejected correctly when below	TO09B22	If the take-off is rejected when the aircraft is below V1 then this is a	9;	13; 18; 22;	31; 38; 41;	50; 51; 54; 55; 58; 5	
	V1		success, but it must be included to obtain the pivotal event probability.				60; 61; 62; 63	
	Flight crew fails to maintain control (Take-off rejected)							
8	Uncontrollable	TO09B31	No input to controls will allow the pilot to maintain control of the aircraft after take-off rejection	9;	13; 18; 22;	31; 38; 41;	50; 51; 54; 55; 58; 5 60; 61; 62; 63	
9	Lack of control	TO09B32	The pilot makes no attempt to control the aircraft after take-off	9;	13; 18; 22;	31; 38; 41;	50; 51; 54; 55; 58; 5	
10	Incorrect Control	TO09B33	rejection The pilot applies incorrect control to the aircraft after take-off	9;	13; 18; 22;	31; 38; 41;	60; 61; 62; 63 50; 51; 54; 55; 58; 5	
11	Insufficient control	TO09B34	rejection. This can be due to improper training, stress and fatigue The pilot applies correct measures after take-off rejection but are	9;	13; 18; 22;	31; 38; 41;	60; 61; 62; 63 50; 51; 54; 55; 58; 5	
			not enough to prevent aircraft leaving off the side of the runway	,	., ., ,	, , , ,	60; 61; 62; 63	
	Failure to achieve maximum braking Insufficient Runway Length	TO09B41	The runway is too short under wet or icy runway conditions for the plane to come to a halt even if the take-off is aborted before V1 is reached.	9;	13; 18; 22;	31; 38; 41;	50; 51; 54; 55; 58; 5 60; 61; 62; 63	
13	Brakes not functioning correctly	TO09B42	Brakes are not giving maximum braking, i.e. because of improper	7; 9;	13; 18; 22;	31; 38; 41;	50; 51; 54; 55; 58; 5	
14	Brakes not applied correctly	TO09B43	maintenance and damages Failure of the flight crew to apply all the braking systems	9;	13; 18; 22;	28; 29; 30; 31; 38; 41;	60; 61; 62; 63 50; 51; 54; 55; 58; 5	
V	Figiht crew fails to maintain control		immediately after take-off rejection.				60; 61; 62; 63	
	(Take-off continued)							
15	Uncontrollable	TO09B51	No input to controls will allow the pilot to maintain control of the aircraft after take-off continuation	9;	13; 18; 22;	31; 38; 41;	50; 51; 54; 55; 58; 5 60; 61; 62; 63	
16	Lack of control	TO09B52	The pilot makes no attempt to control the aircraft after take-off	9;	13; 18; 22;	31; 38; 41;	50; 51; 54; 55; 58; 5	
17	Incorrect Control	TO09B53	continuation The pilot applies incorrect control to the aircraft after take-off continuation. This can be due to improper training, stress and	9;	13; 18; 22;	31; 38; 41;	60; 61; 62; 63 50; 51; 54; 55; 58; 5 60; 61; 62; 63	
			fatigue					
18	Insufficient control	TO09B54	The pilot applies correct measures after take-off continuation but are not enough to prevent aircraft leaving off the side of the runway	9;	13; 18; 22;	31; 38; 41;	50; 51; 54; 55; 58; 5 60; 61; 62; 63	
SD 10	Base events	Code	Definition	Technology	Human	Organisation	System of	
1	Pitch Control Problem						Organisations	
	Trim settings incorrectly determined	TO10B1111	Flight crew fail to complete the trim configuration checklist and fail		22;		50; 51; 54; 55; 58; 59 60; 61; 62; 63	
2	Speed settings incorrectly determined	TO10B1112	to verify the checklist Flight crew fail to complete the speed bug checklist and fail to verify the checklist		22;		50; 51; 54; 55; 58; 5 60; 61; 62; 63	
	Trim settings incorrectly entered into	TO10B112	Given that the trim settings have been correctly determined, the co		22;		50; 51; 54; 55; 58; 5	
	FMC		pilot enter the settings incorrectly and these are verified by the captain during the taxi checklist				60; 61; 62; 63	
	Speed settings incorrectly entered into FMC	10108113	Given that the speed bugs have been correctly determined, flight crew enter the settings incorrectly and these are verified by the captain during the taxi checklist		22;		50; 51; 54; 55; 58; 5 60; 61; 62; 63	
5	Unsuccessful Pitch Control Inputs	TO10B12	Flight crew applies inappropriate inputs to the flight controls causing pitch control problems and resulting in difficulty taking off.		22;		50; 51; 54; 55; 58; 59 60; 61; 62; 63	
6	Unsuccessful Design	TO10B1311	Unsuccessful design of one of the integral components causes the	3;	22;		50; 51; 54; 55; 58; 5	
7	Unsuccessful Manufacture	TO10B1312	failure of a flight control system Unsuccessful manufacture of one of the integral components	3;	22;		60; 61; 62; 63 50; 51; 54; 55; 58; 59	
R	Unsuccessful Maintenance	TO10B1313	causes the failure of a flight control system Maintenance of the flight control system is not conducted or not	3;	22;		60; 61; 62; 63 50; 51; 54; 55; 58; 5	
J			successfully completed such that one of the flight control system fails	·			60; 61; 62; 63	
9	Foreign Object Damage	TO10B1314	A foreign object strikes one of the control surfaces rendering it ineffective. Such objects include birds and runway debris	3; 7;	22;		49; 50; 51; 54; 55; 5 59; 60; 61; 62; 63	
	i de la companya de la companya de la companya de la companya de la companya de la companya de la companya de	1	menective, out if opiects include pirds and runway debris	1	1	1	בנו :עס :עט פנו	



Base events	Code	Definition	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
10 Severe Flight Control System Failure	TO10B132	Given the occurrence of a flight control system failure, the failure is	3;	22;		50; 51; 54; 55; 58; 59;
		severe enough to cause a pitch control problem				60; 61; 62; 63
II Flight crew rejects to take-off						
11 Crew Misdiagnose Situation	TO10B211	The pilot misdiagnoses the situation and either fails to realise what	3; 7;	22;		49; 50; 51; 54; 55; 58;
		is causing the pitch control problems or wrongly attributes them to				59; 60; 61; 62; 63
		something else.				
12 Crew Misjudge Situation	TO10B212	The flight crew diagnoses the situation, realising what is causing the	3; 7;	22;		49; 50; 51; 54; 55; 58;
		pitch control problems but misjudges the situation and incorrectly				59; 60; 61; 62; 63
		aborts the take-off when the aircraft is above V1				
13 Take-off rejected correctly when below	TO10B22	If the take-off is rejected when the aircraft is below V1 then this is a	3; 7;	22;		49; 50; 51; 54; 55; 58;
V1		success, but it must be included to obtain the pivotal event				59; 60; 61; 62; 63
		probability.				
III Failure to achieve maximum braking						
14 Insufficient Runway Length	TO10B31	The runway is too short under wet or icy runway conditions for the	3; 7;	22;		49; 50; 51; 54; 55; 58;
		plane to come to a halt even if the take-off is aborted before V1 is				59; 60; 61; 62; 63
		reached.				
15 Brakes not functioning correctly	TO10B32	Brakes are not giving maximum braking, i.e. because of improper	3; 7;	22;		49; 50; 51; 54; 55; 58;
		maintenance and damages				59; 60; 61; 62; 63
16 Brakes not applied correctly	TO10B33	Failure of the flight crew to apply all the braking systems	3; 7;	22;	28; 29; 30;	49; 50; 51; 54; 55; 58;
		immediately after take-off rejection.				59; 60; 61; 62; 63
IV Aircraft fails to rotate and lift off						
17 Pitch Control Misdiagnosed	TO10B41	Flight crew fail to diagnose the cause of the pitch control problems	3; 7;	22;		49; 50; 51; 54; 55; 58;
		and hence fails to rectify the problem.				59; 60; 61; 62; 63
18 Unsucessful Pitch Control Rectification	TO10B42	Flight crew diagnoses the causes of the pitch control problem but	3; 7;	22;		49; 50; 51; 54; 55; 58;
	1	fails to rectify it				59; 60; 61; 62; 63



SPIs: System of Code Identifiable precursors No. SPIs: Technology SPIs: Human SPIs: Organisation Organisations FSD 35 Code Identifiable precursors No. Technology Organisation Organisations Flight crew decision error /operation of equipment error 1 AL35F5211 62 15: 16: 17: 23: 25 26: 27: 33: 35: 36: 37: 50; 51; 56; 57; 59; 60; Ground Navigational Aid failure 61; 62; 63 38; 39; Inadequate NOTAM information concerning ground navigational aid failure 68 Traffic controller tiredness - Inadequate workload distribution 137 Flaws in traffic controller requirements definition process and/or training methodology 145 149 Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 distribution Not recognized ground Navaids System failure not reflected in NOTAM messages 308 488 Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS) Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS) 490 Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS) 50; 51; 56; 57; 59; 60; 2 AL35F5212 System failure affecting the operation of primary instruments / displays or standby 15; 16; 17; 21; 23; 25 26; 27; 33; 35; 36; 37; 61; 62; 63 instruments 38; 39; Flaws in maintenance technician / airworthiness specialist requirements definition 149 process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Lack of adherence to the SOP in terms of critical indicators cross-checking 224 Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting 303 systems warning. Navigational aid failure. Flaws in aircraft system maintenance process definition - Onboard navigational system 491 and components Inadequate certification process and / or flaws in methodology concerning verification 492 of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and 493 components. 3 AL35F5213 15: 16: 17: 18: 21: 23: 26: 27: 31: 33: 35: 36: 50; 51; 54; 55; 58; 59; Inadequate navigational chart 69 60; 61; 62; 63 25 37; 38; 39; Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Lack of adherence to SOP in terms of approach and landing 245 50: 51: 56: 57: 59: 60: 4 AL35F5214 Flaws in aircraft system maintenance process definition - stickshaker 136 15: 16: 17: 23: 26: 35: 36: 37: 38: 39: 61; 62; 63 Flaws in traffic controller requirements definition process and/or training methodology 145 Lack of adherence to SOP for AIR operations in terms of controller error in approach 307 clearence instruction Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 50; 51; 56; 57; 59; 60; 5 AL35F522 15: 16: 17: 18: 20: 21: 26: 27: 32: 33: 34: 35: 151 or / and passive contribution to the PF duties 36; 37; 38; 39; 61; 62; 63 Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Lack of adherence to SOP in terms of approach and landing 245 6 AL35F523 Adverse weather / poor visibility conditions / darkness 15: 16: 17: 23: 25 26: 27: 36: 37: 38: 39: 48; 50; 51; 59; 60; 61; 62; 63 Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Lack of adherence to SARPs included in Annex 14 and related documents in terms of 225 RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). Altimeter setting error 274 7 AI 35F524 Pilot tiredness - Inadequate workload distribution 167 15; 16; 17; 18; 20; 23; 26; 27; 36; 37; 38; 39; 50: 51: 56: 57: 59: 60: 61; 62; 63

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15; 16; 17; 18; 20; 21;

26; 36; 37; 38; 39;

26; 27; 31; 33; 35; 36;

37; 38; 39;

48; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63

50; 51; 52; 53; 54; 55;

56; 57; 58; 59; 60; 61; 62; 63

Flaws in pilot requirements definition process and/or training methodology

Inadequate NOTAM information concerning ground navigational aid failure

Flaws in traffic controller requirements definition process and/or training methodology

Flaws in maintenance technician / airworthiness specialist requirements definition

Lack of adherence to SOP in terms of approach and landing

Traffic controller tiredness - Inadequate workload distribution

Adverse weather / poor visibility conditions / darkness

GPWS / TAWS alert / warning (genuine or spurious)

MSAW warning Ground Navigational Aid failure

process and/or training methodology

8 AL35F53

9 AL35F6211



SPIs: System of Code Identifiable precursors No. SPIs: Technology SPIs: Human **SPIs: Organisation** Organisations Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Failure to check navigation accuracy before approach nadequate certification process and / or flaws in methodology concerning verification 299 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) Not recognized ground Navaids System failure not reflected in NOTAM messages 308 Flaws in aircraft system maintenance process definition - Ground navigational systems 488 and components (e.g. ILS) Inadequate certification process and / or flaws in methodology concerning verification 489 of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS) Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS) 10 AL35F6212 System failure affecting the operation of primary instruments / displays or standby 26 3. 15; 16; 17; 18; 20; 21; 26; 27; 31; 33; 35; 36; 50: 51: 54: 55: 56: 57: instruments 23; 25 37; 38; 39; 58; 59; 60; 61; 62; 63 Flaws in maintenance technician / airworthiness specialist requirements definition 149 process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Lack of adherence to the SOP in terms of critical indicators cross-checking 224 Failure to check navigation accuracy before approach 275 Inadequate certification process and / or flaws in methodology concerning verification 299 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting 303 systems warning. Navigational aid failure. Flaws in aircraft system maintenance process definition - Onboard navigational system 491 and components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and 493 components. 11 AL35F6213 Flaws in maintenance technician / airworthiness specialist requirements definition 149 15; 16; 17; 20; 23; 26; 37; 38; 39; 50; 51; 59; 60; 61; 62; process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 distribution Inadequate certification process and / or flaws in methodology concerning verification 489 of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS) 50; 51; 54; 55; 58; 59; 12 AL35F6214 Error in preparation of database for FMS 3; 15; 16; 17; 18; 21; 24; 26; 27; 31; 33; 37; 38; 39; 60; 61; 62; 63 Flaws in maintenance technician / airworthiness specialist requirements definition 149 process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 distribution 13 AL35F622 26; 27; 31; 33; 37; 38; 50; 51; 54; 55; 58; 59; System failure affecting the operation of primary instruments / displays or standby 15; 16; 17; 18; 21; 24; instruments 39; 60; 61; 62; 63 149 Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology 150 Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution nadequate certification process and / or flaws in methodology concerning verification 299 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) Flaws in manufacturer quality control process - FMS subsystem and components 306 (autopilot incl.) Flaws in aircraft system maintenance process definition - FMS subsystems and 410 components (autopilot incl.) 14 AL35F623 50; 51; 54; 55; 58; 59; Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 15: 16: 17: 18: 21: 24: 26: 27: 31: 33: 37: 38: or / and passive contribution to the PF duties 60; 61; 62; 63 25 39; 167 Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology 168 269 Incorrect use of automation - FMS Unintuitive and / or error prone system manual - FMS 494 50: 51: 54: 55: 58: 59: 15 AL35F624 Pilot tiredness - Inadequate workload distribution 167 15; 16; 17; 18; 21; 24; 26; 27; 31; 33; 37; 38; 39; 60; 61; 62; 63 Flaws in pilot requirements definition process and/or training methodology 168 Lack of adherence to SOP in terms of approach and landing 245 Incorrect use of automation - FMS 269 16 AL35F63 Adverse weather / poor visibility conditions / darkness 15: 16: 17: 20: 23: 26: 36: 37: 38: 39: 48; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63 GPWS / TAWS alert / warning (genuine or spurious) 50 17 AL35F721 Traffic controller tiredness - Inadequate workload distribution 137 15; 16; 17; 20; 23; 26; 36; 37; 38; 39; 50: 51: 56: 57: 59: 60: 61: 62: 63



SPIs: System of Code Identifiable precursors No. SPIs: Technology SPIs: Human **SPIs: Organisation** Organisations Flaws in traffic controller requirements definition process and/or training methodology 145 Current airport diagram not reflecting critical changes 155 18 AL35F722 15: 16: 17: 20: 23: 50; 51; 56; 57; 59; 60; Prolonged loss of communications (PLOC) between pilot and controller(s) 53 26: 36: 37: 38: 39: 61; 62; 63 Lack of English proficiency 132 ncorrect or confusing / misleading ATC instructions 133 Use of non-standard phraseology by pilot and/or controller 134 Traffic controller tiredness - Inadequate workload distribution 137 Flaws in traffic controller requirements definition process and/or training methodology 145 Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle 148 driver Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 19 AL35F723 50; 51; 59; 60; 61; 62; Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 15; 16; 17; 18; 20; 21; 26; 36; 37; 38; 39; or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Lack of adherence to SOP in terms of approach and landing 245 48; 50; 51; 54; 55; 58; 20 AL35F73 Adverse weather / poor visibility conditions / darkness 15; 16; 17; 20; 23; 26; 36; 37; 38; 39; 59; 60; 61; 62; 63 GPWS / TAWS alert / warning (genuine or spurious) 50 MSAW warning Flight crew CRM failure 21 AL35B4111 Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 15; 16; 17; 18; 20; 21; 26: 27: 31: 32: 33: 34: 48: 50: 51: 52: 53: 54: 55; 56; 57; 58; 59; 60; or / and passive contribution to the PF duties 35; 36; 37; 38; 39; 61; 62; 63 Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Flaws in CRM training procedures 263 Lack of adherence to the main CRM rules 264 Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby 26 nstruments GPWS / TAWS alert / warning (genuine or spurious) 50 MSAW warning 51 Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS 61 Ground Navigational Aid failure 62 Inadequate NOTAM information concerning ground navigational aid failure 68 Inadequate navigational chart 69 Lack of English proficiency 132 Lack of adherence to SOP during aircraft storage and / or maintenance in terms of 233 protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller 134 Traffic controller tiredness - Inadequate workload distribution 137 Flaws in traffic controller requirements definition process and/or training methodology 145 Lack of or poor communication quality 146 Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle 148 driver Flaws in maintenance technician / airworthiness specialist requirements definition 149 process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes 155 Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology 168 Lack of adherence to the SOP in terms of critical indicators cross-checking 224 Lack of adherence to SARPs included in Annex 14 and related documents in terms of 225 RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). Lack of adherence to SOP in terms of approach and landing 245 ncorrect use of automation - FMS 269 Altimeter setting error 274 Failure to check navigation accuracy before approach 275 Inadequate certification process and / or flaws in methodology concerning verification 299 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting 303 systems warning. Navigational aid failure Flaws in manufacturer quality control process - FMS subsystem and components 306 (autopilot incl.) Lack of adherence to SOP for AIR operations in terms of controller error in approach 307 clearence instruction Not recognized ground Navaids System failure not reflected in NOTAM messages 308 Flaws in aircraft system maintenance process definition - FMS subsystems and 410 components (autopilot incl.) Flaws in aircraft system maintenance process definition - Ground navigational systems 488



SPIs: System of Code Identifiable precursors No. SPIs: Technology SPIs: Human SPIs: Organisation Organisations Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS) Flaws in manufacturer quality control process - Ground navigational systems and 490 components (e.g. ILS) Flaws in aircraft system maintenance process definition - Onboard navigational systems and components Inadequate certification process and / or flaws in methodology concerning verification 492 of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and 493 components Unintuitive and / or error prone system manual - FMS 494 22 AL35B4112 Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 3: 15: 16: 17: 18: 20: 21: 26: 27: 31: 32: 33: 34: 48: 50: 51: 52: 53: 54: or / and passive contribution to the PF duties 23: 24: 25 35: 36: 37: 38: 39: 55: 56: 57: 58: 59: 60: 61; 62; 63 Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology 168 Flaws in CRM training procedures 263 Lack of adherence to the main CRM rules 264 Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby 26 GPWS / TAWS alert / warning (genuine or spurious) 50 MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) 53 Error in preparation of database for FMS 61 Ground Navigational Aid failure 62 nadequate NOTAM information concerning ground navigational aid failure 68 Inadequate navigational chart 69 Lack of English proficiency 132 Lack of adherence to SOP during aircraft storage and / or maintenance in terms of 233 protecting of critical aircraft systems against contamination 134 Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution 137 Flaws in traffic controller requirements definition process and/or training methodology 145 Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle 148 driver Flaws in maintenance technician / airworthiness specialist requirements definition 149 process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes 155 Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Lack of adherence to the SOP in terms of critical indicators cross-checking Lack of adherence to SARPs included in Annex 14 and related documents in terms of 225 RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). Lack of adherence to SOP in terms of approach and landing 245 Incorrect use of automation - FMS 269 Altimeter setting error 274 Failure to check navigation accuracy before approach 275 nadequate certification process and / or flaws in methodology concerning verification 299 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting 303 systems warning. Navigational aid failure. Flaws in manufacturer quality control process - FMS subsystem and components 306 (autopilot incl.) Lack of adherence to SOP for AIR operations in terms of controller error in approach 307 clearence instruction Not recognized ground Navaids System failure not reflected in NOTAM messages 308 Flaws in aircraft system maintenance process definition - FMS subsystems and 410 components (autopilot incl.) 488 Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS) nadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS) Flaws in manufacturer quality control process - Ground navigational systems and 490 components (e.g. ILS) Flaws in aircraft system maintenance process definition - Onboard navigational systems and components Inadequate certification process and / or flaws in methodology concerning verification 492 of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and 493 components. Unintuitive and / or error prone system manual - FMS 494



SPIs: System of

	Code	Identifiable precursors	No	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
_	AL35B4113	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151		15; 16; 17; 18; 20; 21;	26; 27; 31; 32; 33; 34;	48; 50; 51; 52; 53; 54
23	AE3354113	or / and passive contribution to the PF duties	131	3,	23; 24; 25	35; 36; 37; 38; 39;	55; 56; 57; 58; 59; 60
		of y and passive contribution to the FF daties			25, 24, 25	33, 30, 37, 30, 33,	61; 62; 63
		Pilot tiredness - Inadequate workload distribution	167				,,
		Flaws in pilot requirements definition process and/or training methodology	168				
		Lack of adherence to SOP in terms of approach and landing	245				
		Flaws in CRM training procedures	263				
		Lack of adherence to the main CRM rules	264				
		Adverse weather / poor visibility conditions / darkness	6				
		System failure affecting the operation of primary instruments / displays or standby	26				
		instruments					
		GPWS / TAWS alert / warning (genuine or spurious)	50				
		MSAW warning	51				
		Prolonged loss of communications (PLOC) between pilot and controller(s)	53				
		Error in preparation of database for FMS	61				
		Ground Navigational Aid failure	62				
		Inadequate NOTAM information concerning ground navigational aid failure	68				
		Inadequate navigational chart	69				
		Lack of English proficiency	132				
		Lack of adherence to SOP during aircraft storage and / or maintenance in terms of	233				
		protecting of critical aircraft systems against contamination					
		Use of non-standard phraseology by pilot and/or controller	134				
\neg		Traffic controller tiredness - Inadequate workload distribution	137				
\neg		Flaws in traffic controller requirements definition process and/or training methodology	-				
		The controller requirements definition process and/or training methodology	1-73				
\dashv		Lack of or poor communication quality	146		1		
		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	148	 			
		driver	140				
-		Flaws in maintenance technician / airworthiness specialist requirements definition	149	 	+	<u> </u>	
		process and/or training methodology	149				
-		Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150	+	+	+	
		distribution	120				
-		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151	 	+		
		or / and passive contribution to the PF duties	131				
-		Current airport diagram not reflecting critical changes	155				
-			167				
-		Pilot tiredness - Inadequate workload distribution					
-		Flaws in pilot requirements definition process and/or training methodology	168 224				
-		Lack of adherence to the SOP in terms of critical indicators cross-checking	225				
		Lack of adherence to SARPs included in Annex 14 and related documents in terms of	225				
		RWY parameters and location, attitude, approach path parameters and obstacles					
-		locations (e.g. mountains).					
-		Lack of adherence to SOP in terms of approach and landing	245				
-		Incorrect use of automation - FMS	269				
-		Altimeter setting error	274				
-		Failure to check navigation accuracy before approach	275				
		Inadequate certification process and / or flaws in methodology concerning verification	299				
		of the system / product compliance with requirements - FMS subsystems and					
-		components (autopilot incl.)					
		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting	303				
-		systems warning. Navigational aid failure. Flaws in manufacturer quality control process - FMS subsystem and components	200				
			306				
-		(autopilot incl.)					
		Lack of adherence to SOP for AIR operations in terms of controller error in approach	307				
-		clearence instruction					
-		Not recognized ground Navaids System failure not reflected in NOTAM messages	308				
		Flaws in aircraft system maintenance process definition - FMS subsystems and	410				
-		components (autopilot incl.)	400	-	1		1
		Flaws in aircraft system maintenance process definition - Ground navigational systems	488				
		and components (e.g. ILS)		-	-		
		Inadequate certification process and / or flaws in methodology concerning verification	489				
		of the system / product compliance with requirements - Ground navigational systems					
		and components (e.g. ILS)		-	-		
		Flaws in manufacturer quality control process - Ground navigational systems and	490				
		components (e.g. ILS)	1				
		Flaws in aircraft system maintenance process definition - Onboard navigational systems	491				1
		and components	1				
		Inadequate certification process and / or flaws in methodology concerning verification					
		of the system / product compliance with requirements - Onboard navigational systems					
		and components.	1	1	1		ļ
		Flaws in manufacturer quality control process - Onboard navigational systems and	493				
		components.					
		Unintuitive and / or error prone system manual - FMS	494				
24	AL35B4121	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151	3;	15; 16; 17; 18; 20; 21;	26; 27; 31; 32; 33; 34;	48; 50; 51; 52; 53; 5
		or / and passive contribution to the PF duties			23; 24; 25	35; 36; 37; 38; 39;	55; 56; 57; 58; 59; 6
			L	<u> </u>	<u> </u>	<u> </u>	61; 62; 63
		Pilot tiredness - Inadequate workload distribution	167				
		Flaws in pilot requirements definition process and/or training methodology	168				
		Lack of adherence to SOP in terms of approach and landing	245				
\neg		Flaws in CRM training procedures	263		1		
		Lack of adherence to the main CRM rules	264				
\dashv		Adverse weather / poor visibility conditions / darkness	6				
		System failure affecting the operation of primary instruments / displays or standby	26				
		instruments	-				
 ↓		GPWS / TAWS alert / warning (genuine or spurious)	50	<u> </u>	+		
				The second secon	1	1	1



SPIs: System of

Code Identifiable precursors No. SPIs: Technology SPIs: Human **SPIs: Organisation** Organisations Prolonged loss of communications (PLOC) between pilot and controller(s) 53 Error in preparation of database for FMS 61 Ground Navigational Aid failure 62 Inadequate NOTAM information concerning ground navigational aid failure 68 69 Inadequate navigational chart Lack of English proficiency 132 Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller 134 Traffic controller tiredness - Inadequate workload distribution 137 Flaws in traffic controller requirements definition process and/or training methodology 145 Lack of or poor communication quality 146 Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle 148 driver Flaws in maintenance technician / airworthiness specialist requirements definition 149 process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes 155 Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Lack of adherence to the SOP in terms of critical indicators cross-checking 224 Lack of adherence to SARPs included in Annex 14 and related documents in terms of 225 RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). Lack of adherence to SOP in terms of approach and landing 245 Incorrect use of automation - FMS 269 Altimeter setting error 274 Failure to check navigation accuracy before approach 275 nadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting 303 systems warning. Navigational aid failure. laws in manufacturer quality control process - FMS subsystem and components 306 (autopilot incl.) Lack of adherence to SOP for AIR operations in terms of controller error in approach 307 clearence instruction Not recognized ground Navaids System failure not reflected in NOTAM messages 308 Flaws in aircraft system maintenance process definition - FMS subsystems and 410 components (autopilot incl.) Flaws in aircraft system maintenance process definition - Ground navigational systems 488 and components (e.g. ILS) nadequate certification process and / or flaws in methodology concerning verification 489 of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS) Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS) Flaws in aircraft system maintenance process definition - Onboard navigational systems 491 and components Inadequate certification process and / or flaws in methodology concerning verification 492 of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and 493 components. Unintuitive and / or error prone system manual - FMS 494 48; 50; 51; 52; 53; 54; 25 AL35B4122 Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 15; 16; 17; 18; 20; 21; 26; 27; 31; 32; 33; 34; 151 3; 55; 56; 57; 58; 59; 60; or / and passive contribution to the PF duties 61; 62; 63 Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Lack of adherence to SOP in terms of approach and landing 245 Flaws in CRM training procedures 263 Lack of adherence to the main CRM rules Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby 26 instruments GPWS / TAWS alert / warning (genuine or spurious) 50 MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) 53 Error in preparation of database for FMS 61 Ground Navigational Aid failure 62 Inadequate NOTAM information concerning ground navigational aid failure 68 Inadequate navigational chart 132 Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of 233 protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller 134 137 Traffic controller tiredness - Inadequate workload distribution laws in traffic controller requirements definition process and/or training methodology 145 Lack of or poor communication quality 146



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SPIs: System of Code Identifiable precursors No. SPIs: Technology SPIs: Human SPIs: Organisation Organisations Lack of adherence to SARPs included in Annex 14 and related documents in terms of 225 RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). Lack of adherence to SOP in terms of approach and landing 245 Incorrect use of automation - FMS 269 274 Altimeter setting error Failure to check navigation accuracy before approach nadequate certification process and / or flaws in methodology concerning verification 299 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting 303 systems warning. Navigational aid failure. Flaws in manufacturer quality control process - FMS subsystem and components 306 (autopilot incl.) Lack of adherence to SOP for AIR operations in terms of controller error in approach 307 clearence instruction Not recognized ground Navaids System failure not reflected in NOTAM messages Flaws in aircraft system maintenance process definition - FMS subsystems and 410 omponents (autopilot incl.) Flaws in aircraft system maintenance process definition - Ground navigational systems 488 and components (e.g. ILS) nadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS) Flaws in manufacturer quality control process - Ground navigational systems and 490 components (e.g. ILS) Flaws in aircraft system maintenance process definition - Onboard navigational system and components nadequate certification process and / or flaws in methodology concerning verification 492 of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and 493 components Unintuitive and / or error prone system manual - FMS 27 AL35B4124 Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 3; 15; 16; 17; 18; 20; 21; 26; 27; 31; 32; 33; 34; 48: 50: 51: 52: 53: 54: 55: 56: 57: 58: 59: 60: or / and passive contribution to the PF duties 23; 24; 25 35; 36; 37; 38; 39; 61; 62; 63 Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Lack of adherence to SOP in terms of approach and landing 245 Flaws in CRM training procedures 263 Lack of adherence to the main CRM rules 264 Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby 26 GPWS / TAWS alert / warning (genuine or spurious) 50 MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) 53 Error in preparation of database for FMS 61 Ground Navigational Aid failure 62 Inadequate NOTAM information concerning ground navigational aid failure 68 Inadequate navigational chart 69 Lack of English proficiency 132 Lack of adherence to SOP during aircraft storage and / or maintenance in terms of 233 protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller 134 Traffic controller tiredness - Inadequate workload distribution 137 Flaws in traffic controller requirements definition process and/or training methodology 145 Lack of or poor communication quality 146 Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle 148 Flaws in maintenance technician / airworthiness specialist requirements definition 149 process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes 155 Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Lack of adherence to the SOP in terms of critical indicators cross-checking Lack of adherence to SARPs included in Annex 14 and related documents in terms of 225 RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). Lack of adherence to SOP in terms of approach and landing 245 Incorrect use of automation - FMS 269 274 Altimeter setting error Failure to check navigation accuracy before approach 275 nadequate certification process and / or flaws in methodology concerning verification 299 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting 303 systems warning. Navigational aid failure



SPIs: System of Code Identifiable precursors No. SPIs: Technology SPIs: Human **SPIs: Organisation** Organisations Flaws in manufacturer quality control process - FMS subsystem and components autopilot incl.) Lack of adherence to SOP for AIR operations in terms of controller error in approach 307 clearence instruction Not recognized ground Navaids System failure not reflected in NOTAM messages 308 Flaws in aircraft system maintenance process definition - FMS subsystems and 410 omponents (autopilot incl.) Flaws in aircraft system maintenance process definition - Ground navigational systems 488 and components (e.g. ILS) Inadequate certification process and / or flaws in methodology concerning verification 489 of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS) Flaws in manufacturer quality control process - Ground navigational systems and 490 components (e.g. ILS) Flaws in aircraft system maintenance process definition - Onboard navigational system: 491 and components nadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and 493 components. Unintuitive and / or error prone system manual - FMS 28 AL35B42 15; 16; 17; 18; 20; 21; 26; 27; 31; 32; 33; 34; 48: 50: 51: 52: 53: 54: 167 3; 23; 24; 25 35; 36; 37; 38; 39; 55: 56: 57: 58: 59: 60: 61: 62: 63 Flaws in pilot requirements definition process and/or training methodology 168 Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby 26 instruments GPWS / TAWS alert / warning (genuine or spurious) 50 MSAW warning 51 Prolonged loss of communications (PLOC) between pilot and controller(s) 53 Error in preparation of database for FMS 61 Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure 68 Inadequate navigational chart 69 Lack of English proficiency 132 Lack of adherence to SOP during aircraft storage and / or maintenance in terms of 233 protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller 134 Traffic controller tiredness - Inadequate workload distribution 137 Flaws in traffic controller requirements definition process and/or training methodology 145 Lack of or poor communication quality 146 Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition 149 process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes 155 Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Lack of adherence to the SOP in terms of critical indicators cross-checking Lack of adherence to SARPs included in Annex 14 and related documents in terms of 225 RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). Lack of adherence to SOP in terms of approach and landing 245 Incorrect use of automation - FMS 269 274 Altimeter setting error Failure to check navigation accuracy before approach 275 Inadequate certification process and / or flaws in methodology concerning verification 299 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting 303 systems warning. Navigational aid failure. Flaws in manufacturer quality control process - FMS subsystem and components 306 (autopilot incl.) Lack of adherence to SOP for AIR operations in terms of controller error in approach 307 clearence instruction Not recognized ground Navaids System failure not reflected in NOTAM messages 308 Flaws in aircraft system maintenance process definition - FMS subsystems and 410 components (autopilot incl.) Flaws in aircraft system maintenance process definition - Ground navigational systems 488 and components (e.g. ILS) nadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS) Flaws in manufacturer quality control process - Ground navigational systems and 490 components (e.g. ILS) Flaws in aircraft system maintenance process definition - Onboard navigational system



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SPIs: System of Code Identifiable precursors No. SPIs: Technology SPIs: Human **SPIs: Organisation** Organisations Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby 26 nstruments GPWS / TAWS alert / warning (genuine or spurious) 50 MSAW warning 51 Prolonged loss of communications (PLOC) between pilot and controller(s) 53 Error in preparation of database for FMS 61 Ground Navigational Aid failure 62 Inadequate NOTAM information concerning ground navigational aid failure 68 69 Inadequate navigational chart Lack of English proficiency 132 Lack of adherence to SOP during aircraft storage and / or maintenance in terms of 233 protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller 134 137 Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology 145 Lack of or poor communication quality 146 Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle 148 driver Flaws in maintenance technician / airworthiness specialist requirements definition 149 process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology 168 Lack of adherence to the SOP in terms of critical indicators cross-checking 224 Lack of adherence to SARPs included in Annex 14 and related documents in terms of 225 RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). Lack of adherence to SOP in terms of approach and landing 245 Incorrect use of automation - FMS 269 Altimeter setting error 274 Failure to check navigation accuracy before approach 275 nadequate certification process and / or flaws in methodology concerning verification 299 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting 303 systems warning. Navigational aid failure. Flaws in manufacturer quality control process - FMS subsystem and components 306 (autopilot incl.) Lack of adherence to SOP for AIR operations in terms of controller error in approach 307 clearence instruction Not recognized ground Navaids System failure not reflected in NOTAM messages 308 Flaws in aircraft system maintenance process definition - FMS subsystems and 410 components (autopilot incl.) Flaws in aircraft system maintenance process definition - Ground navigational systems 488 and components (e.g. ILS) Inadequate certification process and / or flaws in methodology concerning verification 489 of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS) Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS) Flaws in aircraft system maintenance process definition - Onboard navigational systems 491 and components Inadequate certification process and / or flaws in methodology concerning verification 492 of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and 493 components. Unintuitive and / or error prone system manual - FMS 494 31 AL35B441 15; 16; 17; 18; 20; 21; 26; 27; 31; 32; 33; 34; 48; 50; 51; 52; 53; 54; 167 Pilot tiredness - Inadequate workload distribution 55; 56; 57; 58; 59; 60; 23: 24: 25 35: 36: 37: 38: 39: 61; 62; 63 Flaws in pilot requirements definition process and/or training methodology 168 Lack of adherence to SOP in terms of approach and landing 245 Flaws in CRM training procedures 263 Lack of adherence to the main CRM rules 264 Imbalanced and inaproppriate relation between cpt and his subordinates Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby 26 instruments 50 GPWS / TAWS alert / warning (genuine or spurious) MSAW warning 51 Prolonged loss of communications (PLOC) between pilot and controller(s) 53 Error in preparation of database for FMS 61 Ground Navigational Aid failure 62 Inadequate NOTAM information concerning ground navigational aid failure 68 69 Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of 233 rotecting of critical aircraft systems against contamination



SPIs: System of Code Identifiable precursors No. SPIs: Technology SPIs: Human **SPIs: Organisation** Organisations Use of non-standard phraseology by pilot and/or controller 134 Traffic controller tiredness - Inadequate workload distribution 137 Flaws in traffic controller requirements definition process and/or training methodology 145 Lack of or poor communication quality 146 Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle 148 driver Flaws in maintenance technician / airworthiness specialist requirements definition 149 process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes 155 167 Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology 168 Lack of adherence to the SOP in terms of critical indicators cross-checking Lack of adherence to SARPs included in Annex 14 and related documents in terms of 225 RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). 245 Lack of adherence to SOP in terms of approach and landing Incorrect use of automation - FMS 269 Altimeter setting error 274 Failure to check navigation accuracy before approach nadequate certification process and / or flaws in methodology concerning verification 299 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting 303 systems warning. Navigational aid failure. Flaws in manufacturer quality control process - FMS subsystem and components 306 (autopilot incl.) Lack of adherence to SOP for AIR operations in terms of controller error in approach 307 clearence instruction Not recognized ground Navaids System failure not reflected in NOTAM messages Flaws in aircraft system maintenance process definition - FMS subsystems and 410 components (autopilot incl.) Flaws in aircraft system maintenance process definition - Ground navigational systems 488 and components (e.g. ILS) nadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS) Flaws in manufacturer quality control process - Ground navigational systems and 490 components (e.g. ILS) Flaws in aircraft system maintenance process definition - Onboard navigational system 491 and components nadequate certification process and / or flaws in methodology concerning verification 492 of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and 493 components. Unintuitive and / or error prone system manual - FMS 494 32 AL35B442 Pilot tiredness - Inadequate workload distribution 167 3: 15: 16: 17: 18: 20: 21: 26: 27: 31: 32: 33: 34: 48: 50: 51: 52: 53: 54: 55; 56; 57; 58; 59; 60; 23: 24: 25 35: 36: 37: 38: 39: 61; 62; 63 Flaws in pilot requirements definition process and/or training methodology 168 Lack of adherence to SOP in terms of approach and landing 245 Flaws in CRM training procedures 263 Lack of adherence to the main CRM rules 264 Adverse weather / poor visibility conditions / darkness 26 System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) 50 MSAW warning 51 Prolonged loss of communications (PLOC) between pilot and controller(s) 53 Error in preparation of database for FMS 61 Ground Navigational Aid failure 68 Inadequate NOTAM information concerning ground navigational aid failure 69 Inadequate navigational chart Lack of English proficiency 132 Lack of adherence to SOP during aircraft storage and / or maintenance in terms of 233 protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller 134 Traffic controller tiredness - Inadequate workload distribution 137 Flaws in traffic controller requirements definition process and/or training methodology 145 Lack of or poor communication quality 146 Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle 148 driver Flaws in maintenance technician / airworthiness specialist requirements definition 149 process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes 155



SPIs: System of Code Identifiable precursors No. SPIs: Technology SPIs: Human **SPIs: Organisation** Organisations Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Lack of adherence to the SOP in terms of critical indicators cross-checking 224 225 Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). Lack of adherence to SOP in terms of approach and landing 245 Incorrect use of automation - FMS 269 Altimeter setting error 274 Failure to check navigation accuracy before approach 275 Inadequate certification process and / or flaws in methodology concerning verification 299 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) 303 Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. Navigational aid failure. Flaws in manufacturer quality control process - FMS subsystem and components 306 (autopilot incl.) Lack of adherence to SOP for AIR operations in terms of controller error in approach 307 clearence instruction Not recognized ground Navaids System failure not reflected in NOTAM messages 308 Flaws in aircraft system maintenance process definition - FMS subsystems and 410 components (autopilot incl.) 488 Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS) nadequate certification process and / or flaws in methodology concerning verification 489 of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS) Flaws in manufacturer quality control process - Ground navigational systems and 490 components (e.g. ILS) Flaws in aircraft system maintenance process definition - Onboard navigational systems 491 and components Inadequate certification process and / or flaws in methodology concerning verification 492 of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and 493 components Unintuitive and / or error prone system manual - FMS 494 Flight crew loss of situation awareness 33 AL35C2 GPWS / TAWS alert / warning (genuine or spurious) 50 15; 16; 17; 18; 20; 21; 26; 27; 31; 32; 33; 34; 48; 50; 51; 52; 53; 54; 23; 24; 25 35; 36; 37; 38; 39; 55; 56; 57; 58; 59; 60; 61: 62: 63 Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby 26 instruments GPWS / TAWS alert / warning (genuine or spurious) 50 MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) 53 Error in preparation of database for FMS 61 Ground Navigational Aid failure 62 Inadequate NOTAM information concerning ground navigational aid failure 68 Inadequate navigational chart 69 Lack of English proficiency 132 Lack of adherence to SOP during aircraft storage and / or maintenance in terms of 233 protecting of critical aircraft systems against contamination 134 Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology 145 Lack of or poor communication quality 146 Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle 148 driver Flaws in maintenance technician / airworthiness specialist requirements definition 149 process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Lack of adherence to the SOP in terms of critical indicators cross-checking 224 Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). Lack of adherence to SOP in terms of approach and landing 245 Incorrect use of automation - FMS 269 Altimeter setting error 275 Failure to check navigation accuracy before approach nadequate certification process and / or flaws in methodology concerning verification 299 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting 303 systems warning. Navigational aid failure.

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Flaws in manufacturer quality control process - FMS subsystem and components

autopilot incl.)



SPIs: System of Code Identifiable precursors No. SPIs: Technology SPIs: Human **SPIs: Organisation** Organisations Lack of adherence to SOP for AIR operations in terms of controller error in approach 307 clearence instruction Not recognized ground Navaids System failure not reflected in NOTAM messages 308 Flaws in aircraft system maintenance process definition - FMS subsystems and 410 components (autopilot incl.) Flaws in aircraft system maintenance process definition - Ground navigational systems 488 and components (e.g. ILS) Inadequate certification process and / or flaws in methodology concerning verification 489 of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS) Flaws in manufacturer quality control process - Ground navigational systems and 490 components (e.g. ILS) Flaws in aircraft system maintenance process definition - Onboard navigational system 491 and components Inadequate certification process and / or flaws in methodology concerning verification 492 of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and 493 components Unintuitive and / or error prone system manual - FMS 494 Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Lack of adherence to SOP in terms of approach and landing 245 Flaws in CRM training procedures 263 Lack of adherence to the main CRM rules 264 Imbalanced and inaproppriate relation between cpt and his subordinates 304 34 AL35B2111 Adverse weather / poor visibility conditions / darkness 15; 16; 17; 18; 20; 21; 26; 27; 31; 32; 33; 34; 48; 50; 51; 52; 53; 54; 23: 24: 25 35; 36; 37; 38; 39; 55; 56; 57; 58; 59; 60; 61; 62; 63 Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby 26 GPWS / TAWS alert / warning (genuine or spurious) 50 MSAW warning 51 Prolonged loss of communications (PLOC) between pilot and controller(s) 53 Error in preparation of database for FMS 61 Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure 68 Inadequate navigational chart 69 Lack of English proficiency 132 Lack of adherence to SOP during aircraft storage and / or maintenance in terms of 233 protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller 134 Traffic controller tiredness - Inadequate workload distribution 137 Flaws in traffic controller requirements definition process and/or training methodology 145 Lack of or poor communication quality 146 Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle 148 driver Flaws in maintenance technician / airworthiness specialist requirements definition 149 process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes 155 Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Lack of adherence to the SOP in terms of critical indicators cross-checking Lack of adherence to SARPs included in Annex 14 and related documents in terms of 225 RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). 245 Lack of adherence to SOP in terms of approach and landing Incorrect use of automation - FMS 269 Altimeter setting error 274 275 Failure to check navigation accuracy before approach Inadequate certification process and / or flaws in methodology concerning verification 299 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting 303 systems warning. Navigational aid failure. Flaws in manufacturer quality control process - FMS subsystem and components 306 (autopilot incl.) Lack of adherence to SOP for AIR operations in terms of controller error in approach 307 clearence instruction Not recognized ground Navaids System failure not reflected in NOTAM messages 308 Flaws in aircraft system maintenance process definition - FMS subsystems and 410 components (autopilot incl.) Flaws in aircraft system maintenance process definition - Ground navigational systems 488 and components (e.g. ILS) nadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground navigational systems



SPIs: System of Code Identifiable precursors No. SPIs: Technology SPIs: Human SPIs: Organisation Organisations Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS) Flaws in aircraft system maintenance process definition - Onboard navigational systems 491 and components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and 493 components. Unintuitive and / or error prone system manual - FMS 494 Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Lack of adherence to SOP in terms of approach and landing 245 Flaws in CRM training procedures 263 Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates 304 35 AI 35B2112 Adverse weather / poor visibility conditions / darkness 15; 16; 17; 18; 20; 21; 26; 27; 31; 32; 33; 34; 48: 50: 51: 52: 53: 54: 55; 56; 57; 58; 59; 60; 23; 24; 25 35; 36; 37; 38; 39; 61; 62; 63 Adverse weather / poor visibility conditions / darkness 26 System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) 50 MSAW warning 51 Prolonged loss of communications (PLOC) between pilot and controller(s) 53 Error in preparation of database for FMS 61 Ground Navigational Aid failure 62 Inadequate NOTAM information concerning ground navigational aid failure 68 Inadequate navigational chart 69 132 Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller 134 Traffic controller tiredness - Inadequate workload distribution 137 Flaws in traffic controller requirements definition process and/or training methodology 145 Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle 148 driver Flaws in maintenance technician / airworthiness specialist requirements definition 149 process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology Lack of adherence to the SOP in terms of critical indicators cross-checking 224 Lack of adherence to SARPs included in Annex 14 and related documents in terms of 225 RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). Lack of adherence to SOP in terms of approach and landing 245 ncorrect use of automation - FMS 269 Altimeter setting error 274 Failure to check navigation accuracy before approach 275 Inadequate certification process and / or flaws in methodology concerning verification 299 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting 303 systems warning. Navigational aid failure. Flaws in manufacturer quality control process - FMS subsystem and components 306 (autopilot incl.) Lack of adherence to SOP for AIR operations in terms of controller error in approach clearence instruction 308 Not recognized ground Navaids System failure not reflected in NOTAM messages Flaws in aircraft system maintenance process definition - FMS subsystems and 410 components (autopilot incl.) Flaws in aircraft system maintenance process definition - Ground navigational systems 488 and components (e.g. ILS) nadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS) Flaws in manufacturer quality control process - Ground navigational systems and 490 components (e.g. ILS) Flaws in aircraft system maintenance process definition - Onboard navigational system: and components nadequate certification process and / or flaws in methodology concerning verification 492 of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and Unintuitive and / or error prone system manual - FMS 494



SPIs: System of

Code Identifiable precursors No. SPIs: Technology SPIs: Human **SPIs: Organisation** Organisations Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Lack of adherence to SOP in terms of approach and landing 245 Flaws in CRM training procedures 263 Lack of adherence to the main CRM rules 264 Imbalanced and inaproppriate relation between cpt and his subordinates 304 48; 50; 51; 52; 53; 54; 36 AL35B212 Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 3; 15; 16; 17; 18; 20; 21; 26; 27; 31; 32; 33; 34; 55; 56; 57; 58; 59; 60; or / and passive contribution to the PF duties 23; 24; 25 35; 36; 37; 38; 39; 61; 62; 63 Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology 168 Lack of adherence to SOP in terms of approach and landing 245 Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby 26 instruments GPWS / TAWS alert / warning (genuine or spurious) 50 MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) 53 Error in preparation of database for FMS 61 Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure 68 Inadequate navigational chart 69 Lack of English proficiency 132 Lack of adherence to SOP during aircraft storage and / or maintenance in terms of 233 protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller 134 Traffic controller tiredness - Inadequate workload distribution 137 Flaws in traffic controller requirements definition process and/or training methodology 145 Lack of or poor communication quality 146 Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle 148 driver Flaws in maintenance technician / airworthiness specialist requirements definition 149 process and/or training methodology 150 Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes 155 Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Lack of adherence to the SOP in terms of critical indicators cross-checking 224 Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). 245 Lack of adherence to SOP in terms of approach and landing Incorrect use of automation - FMS 269 Altimeter setting error Failure to check navigation accuracy before approach 275 Inadequate certification process and / or flaws in methodology concerning verification 299 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. Navigational aid failure. Flaws in manufacturer quality control process - FMS subsystem and components 306 (autopilot incl.) Lack of adherence to SOP for AIR operations in terms of controller error in approach 307 clearence instruction Not recognized ground Navaids System failure not reflected in NOTAM messages 308 Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.) Flaws in aircraft system maintenance process definition - Ground navigational systems 488 and components (e.g. ILS) nadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS) Flaws in manufacturer quality control process - Ground navigational systems and 490 components (e.g. ILS) Flaws in aircraft system maintenance process definition - Onboard navigational system 491 and components nadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and 493 components. Unintuitive and / or error prone system manual - FMS Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution 167 168 Flaws in pilot requirements definition process and/or training methodology ack of adherence to SOP in terms of approach and landing 245 Flaws in CRM training procedures 263 Lack of adherence to the main CRM rules 264



	Code	Identifiable precursors		SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
		Imbalanced and inaproppriate relation between cpt and his subordinates	304				
37	AL35B213	Natural or artificial obstacle on runway course	60	3;	15; 16; 17; 18; 20; 21; 23; 24; 25	26; 27; 31; 32; 33; 34; 35; 36; 37; 38; 39;	48; 50; 51; 52; 53; 54 55; 56; 57; 58; 59; 60 61; 62; 63
		Pilot tiredness - Inadequate workload distribution	167				
		Flaws in pilot requirements definition process and/or training methodology	168				
		Lack of adherence to SARPs included in Annex 14 and related documents in terms of	295				
		RWY parameters and location, approach path parameters and obstacles locations.					
		Adverse weather / poor visibility conditions / darkness	6				
		System failure affecting the operation of primary instruments / displays or standby	26				
		instruments					
		GPWS / TAWS alert / warning (genuine or spurious)	50				
		MSAW warning	51				
		Prolonged loss of communications (PLOC) between pilot and controller(s)	53 61				
		Error in preparation of database for FMS Ground Navigational Aid failure	62				
		Inadequate NOTAM information concerning ground navigational aid failure	68				
	1	Inadequate navigational chart	69		+		
		Lack of English proficiency	132				
		Lack of adherence to SOP during aircraft storage and / or maintenance in terms of	233				
		protecting of critical aircraft systems against contamination					
		Use of non-standard phraseology by pilot and/or controller	134				
		Traffic controller tiredness - Inadequate workload distribution	137				
		Flaws in traffic controller requirements definition process and/or training methodology	145				
			L		<u> </u>		
		Lack of or poor communication quality	146				
		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	148				
		driver			1		
		Flaws in maintenance technician / airworthiness specialist requirements definition	149				
		process and/or training methodology					
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
		distribution					
		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
		or / and passive contribution to the PF duties					
		Current airport diagram not reflecting critical changes	155				
		Pilot tiredness - Inadequate workload distribution	167				
		Flaws in pilot requirements definition process and/or training methodology	168 224				
		Lack of adherence to the SOP in terms of critical indicators cross-checking	225				
		Lack of adherence to SARPs included in Annex 14 and related documents in terms of	225				
		RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).					
		Lack of adherence to SOP in terms of approach and landing	245				
	 	Incorrect use of automation - FMS	269		+		
		Altimeter setting error	274				
		Failure to check navigation accuracy before approach	275				
		Inadequate certification process and / or flaws in methodology concerning verification	299				
		of the system / product compliance with requirements - FMS subsystems and					
		components (autopilot incl.)					
		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting	303				
		systems warning. Navigational aid failure.					
		Flaws in manufacturer quality control process - FMS subsystem and components	306				
		(autopilot incl.)					
		Lack of adherence to SOP for AIR operations in terms of controller error in approach	307				
		clearence instruction					
		Not recognized ground Navaids System failure not reflected in NOTAM messages	308				
		Flaws in aircraft system maintenance process definition - FMS subsystems and	410				
		components (autopilot incl.)					
	1		488		1	1	
	-	and components (e.g. ILS)	40-	-			
	1		489		1	1	
		of the system / product compliance with requirements - Ground navigational systems					
		and components (e.g. ILS)					
		Flaws in manufacturer quality control process - Ground navigational systems and	490				
		components (e.g. ILS)	401				
		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491				
			492				
	1	of the system / product compliance with requirements - Onboard navigational systems	432		1	1	
	1	and components.			1	1	
		Flaws in manufacturer quality control process - Onboard navigational systems and	493	1			
					1	1	
		, , ,			1		
		components.	494				
		components. Unintuitive and / or error prone system manual - FMS	494 151				
		components.	_				
		components. Unintuitive and / or error prone system manual - FMS Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	_				
		components. Unintuitive and / or error prone system manual - FMS Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151				
		components. Unintuitive and / or error prone system manual - FMS Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution	151 167				
		components. Unintuitive and / or error prone system manual - FMS Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	151 167 168				
		components. Unintuitive and / or error prone system manual - FMS Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pillot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing	151 167 168 245				
		components. Unintuitive and / or error prone system manual - FMS Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures	151 167 168 245 263				
38	AL35C3	components. Unintuitive and / or error prone system manual - FMS Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules	151 167 168 245 263 264	3;	15; 16; 17; 18; 20; 21;	26; 27; 31; 32; 33; 34;	
38	AL35C3	components. Unintuitive and / or error prone system manual - FMS Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates	151 167 168 245 263 264 304	3;	15; 16; 17; 18; 20; 21; 23; 24; 25	26; 27; 31; 32; 33; 34; 35; 36; 37; 38; 39;	48; 50; 51; 52; 53; 5 55; 56; 57; 58; 59; 6
38	AL35C3	components. Unintuitive and / or error prone system manual - FMS Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates Natural or artificial obstacle on runway course	151 167 168 245 263 264 304 60	3;			
38	AL35C3	components. Unintuitive and / or error prone system manual - FMS Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates	151 167 168 245 263 264 304				55; 56; 57; 58; 59; 6



SPIs: System of Organisations

Codo	Idoutifiable massurace	Na	CDIs. Tooknology	CDIa: Human	CDIs: Organisation	SPIs: System of
Code	Identifiable precursors Lack of adherence to SOP in terms of approach and landing	245	SPIs: Technology	SPIs: Human	SPIs: Organisation	Organisations
	Premature descent to DA(H) before G/S intercept or premature descent to MDA(H)	281				
	before final-descent-point / FAF	201				
+	Adverse weather / poor visibility conditions / darkness	6		+		
	System failure affecting the operation of primary instruments / displays or standby	26				
	instruments					
	GPWS / TAWS alert / warning (genuine or spurious)	50				
	MSAW warning	51				
	Prolonged loss of communications (PLOC) between pilot and controller(s)	53				
	Error in preparation of database for FMS	61				
	Ground Navigational Aid failure	62				
	Inadequate NOTAM information concerning ground navigational aid failure	68				
	Inadequate navigational chart	69				
	Lack of English proficiency	132				
	Lack of adherence to SOP during aircraft storage and / or maintenance in terms of	233				
	protecting of critical aircraft systems against contamination					
	Use of non-standard phraseology by pilot and/or controller	134				
	Traffic controller tiredness - Inadequate workload distribution	137				
	Flaws in traffic controller requirements definition process and/or training methodology	145				
	,					
	Lack of or poor communication quality	146				
	Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	148				
	driver	1.0				
	Flaws in maintenance technician / airworthiness specialist requirements definition	149				
	process and/or training methodology	1-75		1		1
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150		1		
	distribution	130				1
	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151		1		
	or / and passive contribution to the PF duties	1231				1
+	Current airport diagram not reflecting critical changes	155	+	+	 	
+	Pilot tiredness - Inadequate workload distribution	167		+	 	
+	Flaws in pilot requirements definition process and/or training methodology	168				
+	Lack of adherence to the SOP in terms of critical indicators cross-checking	224		+	 	
+	Lack of adherence to SARPs included in Annex 14 and related documents in terms of	225		+	 	
	RWY parameters and location, attitude, approach path parameters and obstacles	223				
	locations (e.g. mountains).					
	Lack of adherence to SOP in terms of approach and landing	245				
+	Incorrect use of automation - FMS	269		+		
	Altimeter setting error	274		+		
		275				
	Failure to check navigation accuracy before approach	299				
	Inadequate certification process and / or flaws in methodology concerning verification	299				
	of the system / product compliance with requirements - FMS subsystems and					
	components (autopilot incl.)	202				
	Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting	303				
	systems warning. Navigational aid failure.	306				
	Flaws in manufacturer quality control process - FMS subsystem and components	306				
	(autopilot incl.) Lack of adherence to SOP for AIR operations in terms of controller error in approach	307				
	clearence instruction	307				
	Not recognized ground Navaids System failure not reflected in NOTAM messages	308				
	Flaws in aircraft system maintenance process definition - FMS subsystems and	410				
	components (autopilot incl.)	410				
	Flaws in aircraft system maintenance process definition - Ground navigational systems	488				
		488				
	and components (e.g. ILS)	400				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground navigational systems	489		1		1
	and components (e.g. ILS)	1				1
	Flaws in manufacturer quality control process - Ground navigational systems and	490		+	 	
	, , ,	490				1
_	components (e.g. ILS)	401		+	-	-
	Flaws in aircraft system maintenance process definition - Onboard navigational systems	491		1		1
+	and components	402		+	+	
	Inadequate certification process and / or flaws in methodology concerning verification	492		1		1
1		1				1
	of the system / product compliance with requirements - Onboard navigational systems				1	
	and components.	402				
	and components. Flaws in manufacturer quality control process - Onboard navigational systems and	493				
	and components. Flaws in manufacturer quality control process - Onboard navigational systems and components.					
	and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. Unintuitive and / or error prone system manual - FMS	494				
	and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. Unintuitive and / or error prone system manual - FMS Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring					
	and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. Unintuitive and / or error prone system manual - FMS Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	494 151				
	and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. Unintuitive and / or error prone system manual - FMS Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution	494 151 167				
	and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. Unintuitive and / or error prone system manual - FMS Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	494 151 167 168				
	and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. Unintuitive and / or error prone system manual - FMS Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing	494 151 167 168 245				
	and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. Unintuitive and / or error prone system manual - FMS Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures	494 151 167 168 245 263				
	and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. Unintuitive and / or error prone system manual - FMS Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules	494 151 167 168 245 263 264				
	and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. Unintuitive and / or error prone system manual - FMS Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates	167 168 245 263 264 304		II. 46, 47, 40, 20, 21	16.37.34.33.33.23	10.50.54.52.53
39 AL35B22A	and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. Unintuitive and / or error prone system manual - FMS Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules	494 151 167 168 245 263 264		15; 16; 17; 18; 20; 21;	26; 27; 31; 32; 33; 34;	
39 AL35B22A	and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. Unintuitive and / or error prone system manual - FMS Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates	167 168 245 263 264 304		15; 16; 17; 18; 20; 21; 23; 24; 25	26; 27; 31; 32; 33; 34; 35; 36; 37; 38; 39;	55; 56; 57; 58; 59;
39 AL35B22A	and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. Unintuitive and / or error prone system manual - FMS Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates Natural or artificial obstacle on runway course	167 168 245 263 264 304 60				
39 AL35B22A	and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. Unintuitive and / or error prone system manual - FMS Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates Natural or artificial obstacle on runway course	167 168 245 263 264 304 60	3;			55; 56; 57; 58; 59;
39 AL35B22A	and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. Unintuitive and / or error prone system manual - FMS Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates Natural or artificial obstacle on runway course Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168 245 263 264 304 60	3;			55; 56; 57; 58; 59;
39 AL35B22A	and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. Unintuitive and / or error prone system manual - FMS Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates Natural or artificial obstacle on runway course Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Premature descent below MDA(H) before reaching the visual-descent-point (VDP)	167 168 245 263 264 304 60	3;			55; 56; 57; 58; 59;
39 AL35B22A	and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. Unintuitive and / or error prone system manual - FMS Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates Natural or artificial obstacle on runway course Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Premature descent below MDA(H) before reaching the visual-descent-point (VDP) Flight below desired flight path during initial and/or final approach	167 168 245 263 264 304 60 167 168 282 282	3;			55; 56; 57; 58; 59;
39 AL35B22A	and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. Unintuitive and / or error prone system manual - FMS Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates Natural or artificial obstacle on runway course Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Premature descent below MDA(H) before reaching the visual-descent-point (VDP)	167 168 245 263 264 304 60	3;			48; 50; 51; 52; 53; 55; 56; 57; 58; 59; 61; 62; 63



SPIs: System of Code Identifiable precursors No. SPIs: Technology SPIs: Human **SPIs: Organisation** Organisations System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) 50 51 MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) 53 Error in preparation of database for FMS 61 Ground Navigational Aid failure 62 Inadequate NOTAM information concerning ground navigational aid failure 68 Inadequate navigational chart 69 132 Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of 233 protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller 134 Traffic controller tiredness - Inadequate workload distribution 137 Flaws in traffic controller requirements definition process and/or training methodology 145 Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle 148 driver 149 Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes 155 Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology Lack of adherence to the SOP in terms of critical indicators cross-checking 224 Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). Lack of adherence to SOP in terms of approach and landing 245 ncorrect use of automation - FMS 269 Altimeter setting error 274 Failure to check navigation accuracy before approach 275 Inadequate certification process and / or flaws in methodology concerning verification 299 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting 303 systems warning. Navigational aid failure. Flaws in manufacturer quality control process - FMS subsystem and components 306 (autopilot incl.) Lack of adherence to SOP for AIR operations in terms of controller error in approach 307 clearence instruction Not recognized ground Navaids System failure not reflected in NOTAM messages 308 Flaws in aircraft system maintenance process definition - FMS subsystems and 410 components (autopilot incl.) Flaws in aircraft system maintenance process definition - Ground navigational systems 488 and components (e.g. ILS) nadequate certification process and / or flaws in methodology concerning verification 489 of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS) Flaws in manufacturer quality control process - Ground navigational systems and 490 components (e.g. ILS) Flaws in aircraft system maintenance process definition - Onboard navigational system and components nadequate certification process and / or flaws in methodology concerning verification 492 of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and 493 Unintuitive and / or error prone system manual - FMS 494 Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology 168 Lack of adherence to SOP in terms of approach and landing 245 Flaws in CRM training procedures 263 Lack of adherence to the main CRM rules 264 304 Imbalanced and inaproppriate relation between cpt and his subordinates 40 AL35B31 Natural or artificial obstacle on runway course 60 15; 16; 17; 18; 20; 21; 26; 27; 31; 32; 33; 34; 48: 50: 51: 52: 53: 54: 23; 24; 25 35; 36; 37; 38; 39; 55; 56; 57; 58; 59; 60; 61: 62: 63 Traffic controller tiredness - Inadequate workload distribution 137 Flaws in traffic controller requirements definition process and/or training methodology 145 Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high 278 Continued approach, when below DA(H) or MDA(H), after loss of visual references 284 Adverse weather / poor visibility conditions / darkness 26 System failure affecting the operation of primary instruments / displays or standby GPWS / TAWS alert / warning (genuine or spurious) 50 MSAW warning 51



SPIs: System of Code Identifiable precursors No. SPIs: Technology SPIs: Human **SPIs: Organisation** Organisations Prolonged loss of communications (PLOC) between pilot and controller(s) 53 Error in preparation of database for FMS 61 Ground Navigational Aid failure 62 Inadequate NOTAM information concerning ground navigational aid failure 68 69 Inadequate navigational chart Lack of English proficiency 132 Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller 134 Traffic controller tiredness - Inadequate workload distribution 137 Flaws in traffic controller requirements definition process and/or training methodology 145 Lack of or poor communication quality 146 Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle 148 driver Flaws in maintenance technician / airworthiness specialist requirements definition 149 process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes 155 Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology 168 Lack of adherence to the SOP in terms of critical indicators cross-checking 224 Lack of adherence to SARPs included in Annex 14 and related documents in terms of 225 RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). Lack of adherence to SOP in terms of approach and landing 245 Incorrect use of automation - FMS 269 Altimeter setting error 274 Failure to check navigation accuracy before approach 275 nadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting 303 systems warning. Navigational aid failure. laws in manufacturer quality control process - FMS subsystem and components 306 (autopilot incl.) Lack of adherence to SOP for AIR operations in terms of controller error in approach 307 clearence instruction Not recognized ground Navaids System failure not reflected in NOTAM messages 308 Flaws in aircraft system maintenance process definition - FMS subsystems and 410 components (autopilot incl.) Flaws in aircraft system maintenance process definition - Ground navigational systems 488 and components (e.g. ILS) nadequate certification process and / or flaws in methodology concerning verification 489 of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS) Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS) Flaws in aircraft system maintenance process definition - Onboard navigational systems 491 and components Inadequate certification process and / or flaws in methodology concerning verification 492 of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and 493 components. Unintuitive and / or error prone system manual - FMS 494 Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Lack of adherence to SOP in terms of approach and landing 245 Flaws in CRM training procedures 263 Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates 41 AI 35B321 Traffic controller tiredness - Inadequate workload distribution 137 3 15; 16; 17; 18; 20; 21; 26: 27: 31: 32: 33: 34: 48: 50: 51: 52: 53: 54: 35: 36: 37: 38: 39: 23: 24: 25 55; 56; 57; 58; 59; 60; 61; 62; 63 145 Flaws in traffic controller requirements definition process and/or training methodology Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby 26 instruments 50 GPWS / TAWS alert / warning (genuine or spurious) MSAW warning 51 Prolonged loss of communications (PLOC) between pilot and controller(s) 53 Error in preparation of database for FMS 61 Ground Navigational Aid failure 62 Inadequate NOTAM information concerning ground navigational aid failure 68 69 Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of 233 rotecting of critical aircraft systems against contamination

process and/or training methodology

Linking of precursors and SPIs



SPIs: System of Code Identifiable precursors No. SPIs: Technology SPIs: Human **SPIs: Organisation** Organisations Use of non-standard phraseology by pilot and/or controller 134 Traffic controller tiredness - Inadequate workload distribution 137 Flaws in traffic controller requirements definition process and/or training methodology 145 Lack of or poor communication quality 146 Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle 148 driver Flaws in maintenance technician / airworthiness specialist requirements definition 149 process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes 155 167 Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology 168 Lack of adherence to the SOP in terms of critical indicators cross-checking Lack of adherence to SARPs included in Annex 14 and related documents in terms of 225 RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). 245 Lack of adherence to SOP in terms of approach and landing Incorrect use of automation - FMS 269 Altimeter setting error 274 Failure to check navigation accuracy before approach nadequate certification process and / or flaws in methodology concerning verification 299 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting 303 systems warning. Navigational aid failure. Flaws in manufacturer quality control process - FMS subsystem and components 306 (autopilot incl.) Lack of adherence to SOP for AIR operations in terms of controller error in approach 307 clearence instruction Not recognized ground Navaids System failure not reflected in NOTAM messages Flaws in aircraft system maintenance process definition - FMS subsystems and 410 components (autopilot incl.) 488 Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS) nadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS) Flaws in manufacturer quality control process - Ground navigational systems and 490 components (e.g. ILS) Flaws in aircraft system maintenance process definition - Onboard navigational system and components nadequate certification process and / or flaws in methodology concerning verification 492 of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and 493 components. Unintuitive and / or error prone system manual - FMS 494 Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Lack of adherence to SOP in terms of approach and landing 245 Flaws in CRM training procedures 263 Lack of adherence to the main CRM rules 264 Imbalanced and inaproppriate relation between cpt and his subordinates 304 48; 50; 51; 52; 53; 54; 42 AL35B3221 15; 16; 17; 18; 20; 21; 26; 27; 31; 32; 33; 34; Lack of adherence to the current technology standards in terms of flight safety 302 3; 55; 56; 57; 58; 59; 60; supporting systems. Lack of MSAW system. 61: 62: 63 Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby 26 instruments GPWS / TAWS alert / warning (genuine or spurious) 50 MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) 53 Error in preparation of database for FMS 61 62 Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure 68 69 Inadequate navigational chart Lack of English proficiency 132 Lack of adherence to SOP during aircraft storage and / or maintenance in terms of 233 protecting of critical aircraft systems against contamination 134 Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution 137 Flaws in traffic controller requirements definition process and/or training methodology 145 Lack of or poor communication quality 146 Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle 148 driver Flaws in maintenance technician / airworthiness specialist requirements definition 149



SPIs: System of Code Identifiable precursors No. SPIs: Technology SPIs: Human **SPIs: Organisation** Organisations Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes 155 Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Lack of adherence to the SOP in terms of critical indicators cross-checking 224 Lack of adherence to SARPs included in Annex 14 and related documents in terms of 225 RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). Lack of adherence to SOP in terms of approach and landing Incorrect use of automation - FMS 269 Altimeter setting error 274 Failure to check navigation accuracy before approach 275 nadequate certification process and / or flaws in methodology concerning verification 299 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting 303 systems warning. Navigational aid failure. Flaws in manufacturer quality control process - FMS subsystem and components 306 (autopilot incl.) Lack of adherence to SOP for AIR operations in terms of controller error in approach 307 clearence instruction Not recognized ground Navaids System failure not reflected in NOTAM messages 308 Flaws in aircraft system maintenance process definition - FMS subsystems and 410 components (autopilot incl.) Flaws in aircraft system maintenance process definition - Ground navigational systems 488 and components (e.g. ILS) nadequate certification process and / or flaws in methodology concerning verification 489 of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS) Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS) Flaws in aircraft system maintenance process definition - Onboard navigational system: 491 and components Inadequate certification process and / or flaws in methodology concerning verification 492 of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and 493 components. Unintuitive and / or error prone system manual - FMS 494 Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Lack of adherence to SOP in terms of approach and landing 245 Flaws in CRM training procedures 263 Lack of adherence to the main CRM rules 264 Imbalanced and inaproppriate relation between cpt and his subordinates 43 AI 35B3222 nadequate certification process and / or flaws in methodology concerning verification 411 3 15; 16; 17; 18; 20; 21; 26: 27: 31: 32: 33: 34: 48: 50: 51: 52: 53: 54: of the system / product compliance with requirements - MSAW System 23: 24: 25 35: 36: 37: 38: 39: 55: 56: 57: 58: 59: 60: 61; 62; 63 Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) 50 MSAW warning 51 Prolonged loss of communications (PLOC) between pilot and controller(s) 53 Error in preparation of database for FMS 61 Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure 68 Inadequate navigational chart 69 Lack of English proficiency 132 Lack of adherence to SOP during aircraft storage and / or maintenance in terms of 233 protecting of critical aircraft systems against contamination 134 Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology 145 Lack of or poor communication quality 146 Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition 149 process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes 155 Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Lack of adherence to the SOP in terms of critical indicators cross-checking



SPIs: System of Code Identifiable precursors No. SPIs: Technology SPIs: Human SPIs: Organisation Organisations Lack of adherence to SARPs included in Annex 14 and related documents in terms of 225 RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). Lack of adherence to SOP in terms of approach and landing 245 Incorrect use of automation - FMS 269 274 Altimeter setting error Failure to check navigation accuracy before approach nadequate certification process and / or flaws in methodology concerning verification 299 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting 303 systems warning. Navigational aid failure. Flaws in manufacturer quality control process - FMS subsystem and components 306 (autopilot incl.) Lack of adherence to SOP for AIR operations in terms of controller error in approach 307 clearence instruction Not recognized ground Navaids System failure not reflected in NOTAM messages Flaws in aircraft system maintenance process definition - FMS subsystems and 410 components (autopilot incl.) 488 Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS) nadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS) Flaws in manufacturer quality control process - Ground navigational systems and 490 components (e.g. ILS) Flaws in aircraft system maintenance process definition - Onboard navigational system and components nadequate certification process and / or flaws in methodology concerning verification 492 of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and 493 components. Unintuitive and / or error prone system manual - FMS 494 Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Lack of adherence to SOP in terms of approach and landing 245 Flaws in CRM training procedures 263 Lack of adherence to the main CRM rules 264 Imbalanced and inaproppriate relation between cpt and his subordinates 304 44 AL35B3223 MSAW warning 15; 16; 17; 18; 20; 21; 26; 27; 31; 32; 33; 34; 48; 50; 51; 52; 53; 54; 51 55; 56; 57; 58; 59; 60; 35: 36: 37: 38: 39: 61; 62; 63 Traffic controller tiredness - Inadequate workload distribution 137 Flaws in traffic controller requirements definition process and/or training methodology 145 Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting 495 systems warning. MSAW warning. Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby 26 instruments GPWS / TAWS alert / warning (genuine or spurious) 50 51 MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) 53 Error in preparation of database for FMS 61 Ground Navigational Aid failure 62 Inadequate NOTAM information concerning ground navigational aid failure 68 Inadequate navigational chart 69 Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of 233 protecting of critical aircraft systems against contamination 134 Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution 137 laws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle 148 driver Flaws in maintenance technician / airworthiness specialist requirements definition 149 process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes 155 Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Lack of adherence to the SOP in terms of critical indicators cross-checking 224 Lack of adherence to SARPs included in Annex 14 and related documents in terms of 225 RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). Lack of adherence to SOP in terms of approach and landing 245 ncorrect use of automation - FMS 269



SPIs: System of

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Code		Identifiable precursors Altimeter setting error	274	SPIs: Technology	SPIs: Human	SPIs: Organisation	Organisations
		Failure to check navigation accuracy before approach	275				
		Inadequate certification process and / or flaws in methodology concerning verification	299				
		of the system / product compliance with requirements - FMS subsystems and					
		components (autopilot incl.)					
		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting	303				
		systems warning. Navigational aid failure.					
		Flaws in manufacturer quality control process - FMS subsystem and components	306				
		(autopilot incl.)					
		Lack of adherence to SOP for AIR operations in terms of controller error in approach	307				
		clearence instruction					
		Not recognized ground Navaids System failure not reflected in NOTAM messages	308				
		Flaws in aircraft system maintenance process definition - FMS subsystems and	410				
		components (autopilot incl.)	400				
		Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS)	488				
		Inadequate certification process and / or flaws in methodology concerning verification	489				
		of the system / product compliance with requirements - Ground navigational systems	403				
		and components (e.g. ILS)					
		Flaws in manufacturer quality control process - Ground navigational systems and	490				
		components (e.g. ILS)					
		Flaws in aircraft system maintenance process definition - Onboard navigational systems	491				
		and components	L		<u> </u>		<u> </u>
		Inadequate certification process and / or flaws in methodology concerning verification	492				
		of the system / product compliance with requirements - Onboard navigational systems					
		and components.					
		Flaws in manufacturer quality control process - Onboard navigational systems and	493				
		components.	<u> </u>	 	<u> </u>	 	
		Unintuitive and / or error prone system manual - FMS	494	 	<u> </u>	<u> </u>	
		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
_		or / and passive contribution to the PF duties	107	 	 	 	+
_		Pilot tiredness - Inadequate workload distribution	167		 		-
_		Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing	168 245			 	+
		Flaws in CRM training procedures	263				
		Lack of adherence to the main CRM rules	264				
		Imbalanced and inaproppriate relation between cpt and his subordinates	304				
45 AL35	5B33	Traffic controller tiredness - Inadequate workload distribution	137	3:	15; 16; 17; 18; 20; 21;	26; 27; 31; 32; 33; 34;	48; 50; 51; 52; 53; 54
				-,	23; 24; 25	35; 36; 37; 38; 39;	55; 56; 57; 58; 59; 60
					,,	,,,,	61; 62; 63
		Flaws in traffic controller requirements definition process and/or training methodology	145				
		Pilot tiredness - Inadequate workload distribution	167				
		Flaws in pilot requirements definition process and/or training methodology	168				
		Late or inadequate response to MSAW warning	286				
		Adverse weather / poor visibility conditions / darkness	6				
		System failure affecting the operation of primary instruments / displays or standby	26				
		instruments					
		GPWS / TAWS alert / warning (genuine or spurious)	50				
		MSAW warning	51				
		Prolonged loss of communications (PLOC) between pilot and controller(s)	53 61				
_		Error in preparation of database for FMS Ground Navigational Aid failure	62				
_		Inadequate NOTAM information concerning ground navigational aid failure	68				
		Inadequate navigational chart	69				
		Lack of English proficiency	132				
		Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of	233	1	†	1	
		protecting of critical aircraft systems against contamination					
		Use of non-standard phraseology by pilot and/or controller	134				
		Traffic controller tiredness - Inadequate workload distribution	137	1		1	
		Flaws in traffic controller requirements definition process and/or training methodology		1		1	
			L		<u> </u>		<u> </u>
		Lack of or poor communication quality	146				
		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	148				
		driver					
		Flaws in maintenance technician / airworthiness specialist requirements definition	149				
		process and/or training methodology	_				
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
		distribution		 	<u> </u>	 	
		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
		or / and passive contribution to the PF duties	155	 	 	 	+
_		Current airport diagram not reflecting critical changes	155	 	 	 	+
-		Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168			 	+
-		Lack of adherence to the SOP in terms of critical indicators cross-checking	224	+	 	+	+
_		Lack of adherence to the SOP in terms of critical indicators cross-checking Lack of adherence to SARPs included in Annex 14 and related documents in terms of	225	+	+	+	+
		RWY parameters and location, attitude, approach path parameters and obstacles	223				
1		locations (e.g. mountains).					
		Lack of adherence to SOP in terms of approach and landing	245	 	+	 	
		Incorrect use of automation - FMS	269			<u> </u>	1
			274		†	1	
		Altimeter setting error					
		Altimeter setting error Failure to check navigation accuracy before approach	275				
		Altimeter setting error Failure to check navigation accuracy before approach Inadequate certification process and / or flaws in methodology concerning verification					
		Failure to check navigation accuracy before approach	275				



SPIs: System of Code Identifiable precursors No. SPIs: Technology SPIs: Human **SPIs: Organisation** Organisations Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. Navigational aid failure. Flaws in manufacturer quality control process - FMS subsystem and components 306 (autopilot incl.) Lack of adherence to SOP for AIR operations in terms of controller error in approach 307 clearence instruction Not recognized ground Navaids System failure not reflected in NOTAM messages 308 Flaws in aircraft system maintenance process definition - FMS subsystems and 410 components (autopilot incl.) 488 Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS) nadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS) 490 Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS) Flaws in aircraft system maintenance process definition - Onboard navigational system and components nadequate certification process and / or flaws in methodology concerning verification 492 of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and 493 components. Unintuitive and / or error prone system manual - FMS 191 Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Lack of adherence to SOP in terms of approach and landing 245 Flaws in CRM training procedures 263 Lack of adherence to the main CRM rules 264 mbalanced and inaproppriate relation between cpt and his subordinates 304 GPWS failure 46 AL35B11 Lack of adherence to the current technology standards in terms of flight safety 293 3; 48: 50: 51: 52: 53: 54: 15; 16; 17; 18; 20; 21; 26; 27; 31; 32; 33; 34; supporting systems. Lack of GPWS 23: 24: 25 35; 36; 37; 38; 39; 55: 56: 57: 58: 59: 60: 61: 62: 63 Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby GPWS / TAWS alert / warning (genuine or spurious) 50 MSAW warning 51 Prolonged loss of communications (PLOC) between pilot and controller(s) 53 Error in preparation of database for FMS 61 Ground Navigational Aid failure 62 Inadequate NOTAM information concerning ground navigational aid failure 68 Inadequate navigational chart 69 Lack of English proficiency 132 Lack of adherence to SOP during aircraft storage and / or maintenance in terms of 233 protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution 137 Flaws in traffic controller requirements definition process and/or training methodology 145 Lack of or poor communication quality 146 Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle 148 driver Flaws in maintenance technician / airworthiness specialist requirements definition 149 process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes 155 Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Lack of adherence to the SOP in terms of critical indicators cross-checking Lack of adherence to SARPs included in Annex 14 and related documents in terms of 225 RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). Lack of adherence to SOP in terms of approach and landing 245 Incorrect use of automation - FMS 269 Altimeter setting error Failure to check navigation accuracy before approach 275 nadequate certification process and / or flaws in methodology concerning verification 299 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting 303 systems warning. Navigational aid failure. Flaws in manufacturer quality control process - FMS subsystem and components 306 autopilot incl.) Lack of adherence to SOP for AIR operations in terms of controller error in approach 307 clearence instruction Not recognized ground Navaids System failure not reflected in NOTAM messages Flaws in aircraft system maintenance process definition - FMS subsystems and 410 omponents (autopilot incl.)



SPIs: System of Code Identifiable precursors No. SPIs: Technology SPIs: Human **SPIs: Organisation** Organisations Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS) Inadequate certification process and / or flaws in methodology concerning verification 489 of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS) Flaws in manufacturer quality control process - Ground navigational systems and 490 omponents (e.g. ILS) Flaws in aircraft system maintenance process definition - Onboard navigational systems 491 and components Inadequate certification process and / or flaws in methodology concerning verification 492 of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and 493 components. Unintuitive and / or error prone system manual - FMS 494 Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Lack of adherence to SOP in terms of approach and landing 245 263 Flaws in CRM training procedures Lack of adherence to the main CRM rules 264 Imbalanced and inaproppriate relation between cpt and his subordinates 304 Adverse weather / poor visibility conditions / darkness MSAW warning 51 Natural or artificial obstacle on runway course 60 Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties 167 Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology 168 Lack of adherence to SOP in terms of approach and landing 245 incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high 278 terrain) Premature descent to DA(H) before G/S intercept or premature descent to MDA(H) 281 before final-descent-point / FAF Premature descent below MDA(H) before reaching the visual-descent-point (VDP) 282 Flight below desired flight path during initial and/or final approach 283 Continued approach, when below DA(H) or MDA(H), after loss of visual references 284 Late or inadequate response to MSAW warning 286 Failure to go-around, when so required 289 Failure to follow published missed-approach procedure 291 Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations Lack of adherence to the current technology standards in terms of flight safety 302 supporting systems. Lack of MSAW system. Inadequate certification process and / or flaws in methodology concerning verification 411 of the system / product compliance with requirements - MSAW System Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting 495 systems warning. MSAW warning. 48; 50; 51; 52; 53; 54; 47 AL35B12 15: 16: 17: 18: 20: 21: 26: 27: 31: 32: 33: 34: Flaws in maintenance technician / airworthiness specialist requirements definition 149 3: 55; 56; 57; 58; 59; 60; process and/or training methodology 23; 24; 25 35; 36; 37; 38; 39; 61; 62; 63 Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 distribution Flaws in aircraft system maintenance process definition - GPWS system components 485 Inadequate certification process and / or flaws in methodology concerning verification 486 of the system / product compliance with requirements - GPWS system components Flaws in manufacturer quality control process - GPWS system components 487 Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby 26 instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) 53 Error in preparation of database for FMS 61 62 Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure 68 69 Inadequate navigational chart Lack of English proficiency 132 Lack of adherence to SOP during aircraft storage and / or maintenance in terms of 233 protecting of critical aircraft systems against contamination 134 Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution 137 Flaws in traffic controller requirements definition process and/or training methodology 145 Lack of or poor communication quality 146 Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle 148 driver Flaws in maintenance technician / airworthiness specialist requirements definition 149 process and/or training methodology



SPIs: System of Code Identifiable precursors No. SPIs: Technology SPIs: Human **SPIs: Organisation** Organisations Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes 155 Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Lack of adherence to the SOP in terms of critical indicators cross-checking 224 Lack of adherence to SARPs included in Annex 14 and related documents in terms of 225 RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). Lack of adherence to SOP in terms of approach and landing Incorrect use of automation - FMS 269 Altimeter setting error 274 Failure to check navigation accuracy before approach 275 nadequate certification process and / or flaws in methodology concerning verification 299 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting 303 systems warning. Navigational aid failure. Flaws in manufacturer quality control process - FMS subsystem and components 306 (autopilot incl.) Lack of adherence to SOP for AIR operations in terms of controller error in approach 307 clearence instruction Not recognized ground Navaids System failure not reflected in NOTAM messages 308 Flaws in aircraft system maintenance process definition - FMS subsystems and 410 components (autopilot incl.) Flaws in aircraft system maintenance process definition - Ground navigational systems 488 and components (e.g. ILS) nadequate certification process and / or flaws in methodology concerning verification 489 of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS) Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS) Flaws in aircraft system maintenance process definition - Onboard navigational systems 491 and components Inadequate certification process and / or flaws in methodology concerning verification 492 of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and 493 components. Unintuitive and / or error prone system manual - FMS 494 Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Lack of adherence to SOP in terms of approach and landing 245 Flaws in CRM training procedures 263 Lack of adherence to the main CRM rules 264 Imbalanced and inaproppriate relation between cpt and his subordinates 304 Adverse weather / poor visibility conditions / darkness MSAW warning 51 Natural or artificial obstacle on runway course 60 Traffic controller tiredness - Inadequate workload distribution 137 Flaws in traffic controller requirements definition process and/or training methodology Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Lack of adherence to SOP in terms of approach and landing ncorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain) Premature descent to DA(H) before G/S intercept or premature descent to MDA(H) 281 before final-descent-point / FAF Premature descent below MDA(H) before reaching the visual-descent-point (VDP) 282 Flight below desired flight path during initial and/or final approach 283 Continued approach, when below DA(H) or MDA(H), after loss of visual references 284 Late or inadequate response to MSAW warning 286 Failure to go-around, when so required 289 Failure to follow published missed-approach procedure 291 Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations Lack of adherence to the current technology standards in terms of flight safety 302 supporting systems. Lack of MSAW system. Inadequate certification process and / or flaws in methodology concerning verification 411 of the system / product compliance with requirements - MSAW System Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting 495 systems warning. MSAW warning.



	Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
SD 32	Code	Identifiable Precursors	No.	Technology	Human	Organisation	System of
- 1	TO32B611	leal of Facilish arcticions.	132		11, 10, 22,	42: 44	Organisations 45; 50; 51; 52; 53; 56
1	10328611	Lack of English proficiency	132		11; 19; 22;	43; 44	57; 58; 59; 60; 61; 62 63
		Incorrect or confusing / misleading ATC instructions	133				
		Use of non-standard phraseology by pilot and/or controller	134				
		Traffic controller tiredness - Inadequate workload distribution	137				
		Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	139				
		Flaws in traffic controller requirements definition process and/or training methodology	154				
		Callsign confusion Current airport diagram not reflecting critical changes	155				
		Takeoff without clearance	157				
		Landing without clearance	158				
2	TO32B612	Lack of English proficiency	132		11; 19; 22;	43; 44	45; 50; 51; 52; 53; 56 57; 58; 59; 60; 61; 62 63
		Incorrect or confusing / misleading ATC instructions	133				
		Use of non-standard phraseology by pilot and/or controller	134				
		Traffic controller tiredness - Inadequate workload distribution	137				
		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence	143				
		Flaws in traffic controller requirements definition process and/or training methodology	145				
		Lack of or poor communication quality	146				
		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	148				
		driver					
3	TO32B412	Runway confusion	1		11; 19; 22;	43; 44	45; 50; 51; 52; 53; 56 57; 58; 59; 60; 61; 62 63
		Lack of English proficiency	132				
		Incorrect or confusing / misleading ATC instructions	133				
		Use of non-standard phraseology by pilot and/or controller	134				
		Traffic controller tiredness - Inadequate workload distribution	137				
		Flaws in traffic controller requirements definition process and/or training methodology					
		Lack of or poor communication quality	146				
4	TO32B421	Hearback ommitted	169 7		11. 10. 22.	42: 44	45; 50; 51; 52; 53; 59
4	10328421	Taxiway confusion	′		11; 19; 22;	43; 44	60; 61; 62; 63
		Lack of English proficiency	132				,.,.,
		Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications	140				
		Lack of adherence to SOP for GND movements.	141				
		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151				
		Pilot tiredness - Inadequate workload distribution	167				
		Flaws in pilot requirements definition process and/or training methodology	168				
		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129				
		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130				
5	TO32B422	Lack of English proficiency	132		11; 19; 22;	43; 44	45; 50; 51; 52; 53; 59 60; 61; 62; 63
		Pilot tiredness - Inadequate workload distribution	167				00, 01, 02, 03
		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
		or / and passive contribution to the PF duties					
		Lack of adherence to SOP for GND movements.	141				
		Flaws in pilot requirements definition process and/or training methodology	168				
		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129				
		Flaws in vehicle driver / equipment operator / ground agent requirements definition	130				
		process and/or training methodology	L	<u> </u>			
6	TO32B41121	Runway confusion	1		11; 19; 22;	43; 44	45; 50; 51; 52; 53; 56 57; 59; 60; 61; 62; 63
	<u> </u>	Traffic controller tiredness - Inadequate workload distribution	137				
		Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	139				
		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current	144				
		situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology	145				
		nawa in traine controller requirements definition process and/or training methodology	145				
		Callsign confusion	154				
		Current airport diagram not reflecting critical changes	155				
		Takeoff without clearance	157				
		Landing without clearance	158		1		45.40.55.55
7	TO32B41122	Adverse weather / poor visibility conditions / darkness	6		11; 19; 22;	43; 44	45; 48; 50; 51; 52; 53 54; 55; 56; 57; 59; 60 61; 62; 63
		Traffic controller tiredness - Inadequate workload distribution	137				
		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient	-				
		separation / clearence					



Code	Identifiable precursors	_	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	Flaws in traffic controller requirements definition process and/or training methodology	145				
	Inadequate management / separation of takeoffs and landings	153				
8 TO32B411111	Traffic controller tiredness - Inadequate workload distribution	137		11; 12; 19; 22;	43; 44	45; 46; 48; 50; 51; 5
						53; 56; 57; 59; 60; 6
						62; 63
	Flaws in traffic controller requirements definition process and/or training methodology	145				
	Lack of adherence to the current technology standards in terms of flight safety	170				
	supporting systems. Lack of ground radar at the airport.	170				
	Lack of adherence to SOP in terms of awareness on supporting systems (warning) -	171				
	ground radar.					
9 TO32B411112	Flaws in maintenance technician / airworthiness specialist requirements definition	149		11; 12; 19; 22;	43; 44	45; 46; 48; 50; 51; 5
	process and/or training methodology					53; 56; 57; 59; 60; 6
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				62; 63
	distribution	130				
	Inadequate certification process and / or flaws in methodology concerning verification	165				
	of the system / product compliance with requirements - Ground Radar					
10 TO32B411113	Traffic controller tiredness - Inadequate workload distribution	137		11; 12; 19; 22;	43; 44	45; 46; 48; 50; 51; 5
						53; 56; 57; 59; 60; 6
		4.45				62; 63
	Flaws in traffic controller requirements definition process and/or training methodology	145				
	Unintuitive and / or error prone system manual - ground radar.	164				
11 TO32B4111211	Adverse weather / poor visibility conditions / darkness	6		11; 12; 19; 22;	43; 44	45; 46; 48; 50; 51;
						53; 56; 57; 59; 60;
		\sqcup		<u> </u>		62; 63
	Lack of adherence to SOP for GND movements. Lack of awareness of own position on	142		1		
	the airsite and airport topology. Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	154		+		
	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151		1		
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168				
	Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	129				
	distribution					
	Flaws in vehicle driver / equipment operator / ground agent requirements definition	130				
12 TO32B4111212	process and/or training methodology Adverse weather / poor visibility conditions / darkness	6		11; 12; 19; 22;	43; 44	45; 46; 48; 50; 51;
12 103284111212	Adverse weather / poor visibility conditions / darkness	В		11; 12; 19; 22;	43; 44	53; 56; 57; 59; 60;
						62; 63
	Inadvertent deviation from cleared taxi route	131				
	Traffic controller tiredness - Inadequate workload distribution	137				
	Lack of adherence to SOP for GND movements. Lack of awareness in terms of current	144				
	situation on the airsite or / and aircraft / vehicle proximity					
	Flaws in traffic controller requirements definition process and/or training methodology	145				
	Current airport diagram not reflecting critical changes	155				
13 TO32B411122	Incorrect or confusing / misleading ATC instructions	133		11; 12; 19; 22; 23;	43; 44	45; 46; 47; 50; 51;
						57; 58; 59; 60; 61;
						63
	Use of non-standard phraseology by pilot and/or controller	134				
	Traffic controller tiredness - Inadequate workload distribution	137				
	Flaws in traffic controller requirements definition process and/or training methodology	145				
	Lack of or poor communication quality	146				
		_		1	+	
	Lack of adherence to SOP in terms of ATCO and approach or ground controller	163				1
	Lack of adherence to SOP in terms of ATCO and approach or ground controller communication	163				
14 TO32B51		6		11; 19; 22;	43; 44	
14 TO32B51	communication Adverse weather / poor visibility conditions / darkness	6		11; 19; 22;	43; 44	45; 48; 50; 51; 52; 59; 60; 61; 62; 63
14 TO32B51	communication Adverse weather / poor visibility conditions / darkness Inadvertent deviation from cleared taxi route	6		11; 19; 22;	43; 44	
14 TO32B51	communication Adverse weather / poor visibility conditions / darkness Inadvertent deviation from cleared taxi route Lack of adherence to SOP for GND movements.	6 131 141		11; 19; 22;	43; 44	
14 TO32B51	communication Adverse weather / poor visibility conditions / darkness Inadvertent deviation from cleared taxi route Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of awareness of own position on	6		11; 19; 22;	43; 44	
14 TO32B51	communication Adverse weather / poor visibility conditions / darkness Inadvertent deviation from cleared taxi route Lack of adherence to SOP for GND movements.	6 131 141		11; 19; 22;	43; 44	
14 TO32B51	communication Adverse weather / poor visibility conditions / darkness Inadvertent deviation from cleared taxi route Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	6 131 141 142 151		11; 19; 22;	43; 44	
14 TO32B51	communication Adverse weather / poor visibility conditions / darkness Inadvertent deviation from cleared taxi route Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution	6 131 141 142 151		11; 19; 22;	43; 44	
14 TO32851	communication Adverse weather / poor visibility conditions / darkness Inadvertent deviation from cleared taxi route Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	131 141 142 151 167 168		11; 19; 22;	43; 44	
14 TO32851	communication Adverse weather / poor visibility conditions / darkness Inadvertent deviation from cleared taxi route Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	6 131 141 142 151		11; 19; 22;	43; 44	
14 T032851	communication Adverse weather / poor visibility conditions / darkness Inadvertent deviation from cleared taxi route Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	131 141 142 151 167 168 129		11; 19; 22;	43; 44	
14 T032851	communication Adverse weather / poor visibility conditions / darkness Inadvertent deviation from cleared taxi route Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition	131 141 142 151 167 168		11; 19; 22;	43; 44	
14 TO32B51	communication Adverse weather / poor visibility conditions / darkness Inadvertent deviation from cleared taxi route Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	131 141 142 151 167 168 129		11; 19; 22;	43; 44	45; 48; 50; 51; 52; 59; 60; 61; 62; 63
	communication Adverse weather / poor visibility conditions / darkness Inadvertent deviation from cleared taxi route Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to topology. Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	131 141 142 151 167 168 129				59; 60; 61; 62; 63
	communication Adverse weather / poor visibility conditions / darkness Inadvertent deviation from cleared taxi route Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Adverse weather / poor visibility conditions / darkness Inadvertent deviation from cleared taxi route	131 141 142 151 167 168 129 130 6				59; 60; 61; 62; 63 45; 48; 50; 51; 52;
	communication Adverse weather / poor visibility conditions / darkness Inadvertent deviation from cleared taxi route Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Adverse weather / poor visibility conditions / darkness Inadvertent deviation from cleared taxi route Lack of adherence to SOP for GND movements.	131 141 142 151 167 168 129 130 6				59; 60; 61; 62; 63 45; 48; 50; 51; 52;
	communication Adverse weather / poor visibility conditions / darkness Inadvertent deviation from cleared taxi route Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Adverse weather / poor visibility conditions / darkness Inadvertent deviation from cleared taxi route Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements.	131 141 142 151 167 168 129 130 6				59; 60; 61; 62; 63 45; 48; 50; 51; 52;
	communication Adverse weather / poor visibility conditions / darkness Inadvertent deviation from cleared taxi route Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Adverse weather / poor visibility conditions / darkness Inadvertent deviation from cleared taxi route Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements.	131 141 142 151 167 168 129 130 6				59; 60; 61; 62; 63 45; 48; 50; 51; 52;
	communication Adverse weather / poor visibility conditions / darkness Inadvertent deviation from cleared taxi route Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Adverse weather / poor visibility conditions / darkness Inadvertent deviation from cleared taxi route Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to He SOP in terms of PNF flight parameters / situation monitoring	131 141 142 151 167 168 129 130 6				59; 60; 61; 62; 63 45; 48; 50; 51; 52;
	communication Adverse weather / poor visibility conditions / darkness Inadvertent deviation from cleared taxi route Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Adverse weather / poor visibility conditions / darkness Inadvertent deviation from cleared taxi route Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	131 141 142 151 167 168 129 130 6				59; 60; 61; 62; 63 45; 48; 50; 51; 52;
	communication Adverse weather / poor visibility conditions / darkness Inadvertent deviation from cleared taxi route Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Adverse weather / poor visibility conditions / darkness Inadvertent deviation from cleared taxi route Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to He SOP in terms of PNF flight parameters / situation monitoring	131 141 142 151 167 168 129 130 6 131 141 142				59; 60; 61; 62; 63 45; 48; 50; 51; 52;
	communication Adverse weather / poor visibility conditions / darkness Inadvertent deviation from cleared taxi route Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Adverse weather / poor visibility conditions / darkness Inadvertent deviation from cleared taxi route Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for FOND movements.	131 141 142 151 167 168 129 130 6 131 141 142 151				59; 60; 61; 62; 63 45; 48; 50; 51; 52;

ground radar.

Linking of precursors and SPIs



SPIs: System of Identifiable precursors Code No. SPIs: Technology SPIs: Human **SPIs: Organisation** Organisations Landing without clearance 158 Lack of adherence to Rules of the Air - runway used for alternating take-offs and 160 landings 17 TO32B54 Adverse weather / poor visibility conditions / darkness 11: 19: 22: 43: 44 45; 48; 50; 51; 52; 53; 56; 57; 59; 60; 61; 62; Inadvertent deviation from cleared taxi route 131 Lack of adherence to SOP for GND movements 141 Lack of adherence to SOP for GND movements. Lack of awareness of own position on 142 the airsite and airport topology. Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 18 TO32B62 Lack of English proficiency 132 11: 19: 22: 43: 44 45: 50: 51: 52: 53: 58: 59; 60; 61; 62; 63 Incorrect or confusing / misleading ATC instructions 133 Use of non-standard phraseology by pilot and/or controller 134 Lack of adherence to SOP for take-off procedure in terms of maintaining adequate 123 separation on the RWY. Lack of or poor communication quality 146 Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 19 TO32B21 Traffic controller tiredness - Inadequate workload distribution 11; 12; 19; 22; 23; 45: 46: 47: 48: 50: 51: 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63 Flaws in traffic controller requirements definition process and/or training methodology 145 Lack of adherence to SOP in terms of awareness on supporting systems (warning) 156 RIMCAS. Lack of adherence to the current technology standards in terms of flight safety 172 supporting systems. Lack of Runway Conflict Warning System. Runway confusion Adverse weather / poor visibility conditions / darkness Taxiway confusion Emergency landing Lack of adherence to SOP for take-off procedure in terms of maintaining adequate 123 separation on the RWY. Inadvertent deviation from cleared taxi route 131 Lack of English proficiency 132 Incorrect or confusing / misleading ATC instructions 133 Use of non-standard phraseology by pilot and/or controller 134 Traffic controller tiredness - Inadequate workload distribution 137 Inefficient / confusing TWR traffic control procedures, inefficient management of hot 139 spots Lack of adherence to SOP for GND movements. 141 Lack of adherence to SOP for GND movements. Lack of awareness of own position on 142 the airsite and airport topology. Lack of adherence to SOP for GND movements, Lack of awareness in terms of sufficient 143 separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current 144 situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology 145 Lack of or poor communication quality 146 Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle 148 driver Flaws in maintenance technician / airworthiness specialist requirements definition 149 process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties Callsign confusion 154 Current airport diagram not reflecting critical changes 155 Takeoff without clearance 157 Landing without clearance 158 Lack of adherence to Rules of the Air - runway used for alternating take-offs and 160 landings Lack of adherence to SOP in terms of ATCO and approach or ground controller 163 communication Unintuitive and / or error prone system manual - ground radar. 164 Inadequate certification process and / or flaws in methodology concerning verification 165 of the system / product compliance with requirements - Ground Radar Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Hearback ommitted 169 Lack of adherence to the current technology standards in terms of flight safety 170 supporting systems. Lack of ground radar at the airport. Lack of adherence to SOP in terms of awareness on supporting systems (warning)



SPIs: System of Code Identifiable precursors No. SPIs: Technology SPIs: Human SPIs: Organisation Organisations Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload 129 distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition 130 process and/or training methodology 20 TO32B22 Flaws in maintenance technician / airworthiness specialist requirements definition 149 11; 12; 19; 22; 23; 43: 44 45; 46; 47; 48; 50; 51; 52; 53; 54; 55; 56; 57; process and/or training methodology 58; 59; 60; 61; 62; 63 Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 distribution 205 Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - RCWS Runway confusion Adverse weather / poor visibility conditions / darkness Taxiway confusion Emergency landing Lack of adherence to SOP for take-off procedure in terms of maintaining adequate 123 separation on the RWY. Inadvertent deviation from cleared taxi route 131 Lack of English proficiency 132 Incorrect or confusing / misleading ATC instructions 133 134 Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution 137 nefficient / confusing TWR traffic control procedures, inefficient management of hot 139 spots Lack of adherence to SOP for GND movements Lack of adherence to SOP for GND movements. Lack of awareness of own position on 142 the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient 143 separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current 144 situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology 145 Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle 148 driver 149 Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties Callsign confusion 154 Current airport diagram not reflecting critical changes 155 Takeoff without clearance 157 Landing without clearance 158 Lack of adherence to Rules of the Air - runway used for alternating take-offs and 160 landings Lack of adherence to SOP in terms of ATCO and approach or ground controller 163 communication Unintuitive and / or error prone system manual - ground radar. 164 Inadequate certification process and / or flaws in methodology concerning verification 165 of the system / product compliance with requirements - Ground Radar 167 Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology 168 Hearback ommitted 169 Lack of adherence to the current technology standards in terms of flight safety 170 supporting systems. Lack of ground radar at the airport. Lack of adherence to SOP in terms of awareness on supporting systems (warning) ground radar. Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition 130 process and/or training methodology 21 TO32B23 156 11; 12; 19; 22; 23; 43; 44 45; 46; 47; 48; 50; 51; Lack of adherence to SOP in terms of awareness on supporting systems (warning) 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63 Traffic controller tiredness - Inadequate workload distribution 137 Flaws in traffic controller requirements definition process and/or training methodology 145 Runway confusion Adverse weather / poor visibility conditions / darkness Taxiway confusion Emergency landing Lack of adherence to SOP for take-off procedure in terms of maintaining adequate 123 separation on the RWY. Inadvertent deviation from cleared taxi route 131 Lack of English proficiency 132 Incorrect or confusing / misleading ATC instructions 133 Use of non-standard phraseology by pilot and/or controller 134 Traffic controller tiredness - Inadequate workload distribution 137 Inefficient / confusing TWR traffic control procedures, inefficient management of hot 139 spots Lack of adherence to SOP for GND movements. 141



SPIs: System of Code Identifiable precursors No. SPIs: Technology SPIs: Human SPIs: Organisation Organisations Lack of adherence to SOP for GND movements. Lack of awareness of own position on 142 the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient 143 separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology 145 Lack of or poor communication quality 146 Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle 148 driver Flaws in maintenance technician / airworthiness specialist requirements definition 149 process and/or training methodology 150 Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties Callsign confusion 154 Current airport diagram not reflecting critical changes 155 Takeoff without clearance 157 158 Landing without clearance Lack of adherence to Rules of the Air - runway used for alternating take-offs and 160 landings Lack of adherence to SOP in terms of ATCO and approach or ground controller 163 164 Unintuitive and / or error prone system manual - ground radar. Inadequate certification process and / or flaws in methodology concerning verification 165 of the system / product compliance with requirements - Ground Radar Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Hearback ommitted 169 Lack of adherence to the current technology standards in terms of flight safety 170 supporting systems. Lack of ground radar at the airport. 171 Lack of adherence to SOP in terms of awareness on supporting systems (warning) ground radar. Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload 129 distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology 22 TO32B24 Traffic controller tiredness - Inadequate workload distribution 11; 12; 19; 22; 23; 43; 44 45: 46: 47: 48: 50: 51: 52: 53: 54: 55: 56: 57: 58; 59; 60; 61; 62; 63 Flaws in traffic controller requirements definition process and/or training methodology 145 Lack of adherence to emergency procedures - RWY collision avoidance 135 Runway confusion Adverse weather / poor visibility conditions / darkness Taxiway confusion Emergency landing Lack of adherence to SOP for take-off procedure in terms of maintaining adequate 123 separation on the RWY. Inadvertent deviation from cleared taxi route 131 Lack of English proficiency 132 Incorrect or confusing / misleading ATC instructions 133 134 Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution 137 nefficient / confusing TWR traffic control procedures, inefficient management of hot 139 spots Lack of adherence to SOP for GND movements. 141 Lack of adherence to SOP for GND movements. Lack of awareness of own position on 142 the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient 143 separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current 144 situation on the airsite or / and aircraft / vehicle proximity laws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle 148 driver 149 Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties Callsign confusion Current airport diagram not reflecting critical changes 155 Takeoff without clearance 157 Landing without clearance 158 Lack of adherence to Rules of the Air - runway used for alternating take-offs and 160 landings Lack of adherence to SOP in terms of ATCO and approach or ground controller 163 communication Unintuitive and / or error prone system manual - ground radar. 164



SPIs: System of Code Identifiable precursors No. SPIs: Technology SPIs: Human SPIs: Organisation Organisations Inadequate certification process and / or flaws in methodology concerning verification 165 of the system / product compliance with requirements - Ground Radar Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Hearback ommitted 169 Lack of adherence to the current technology standards in terms of flight safety 170 supporting systems. Lack of ground radar at the airport. Lack of adherence to SOP in terms of awareness on supporting systems (warning) -171 ground radar. 129 Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition 130 process and/or training methodology 23 TO32B111 Adverse weather / poor visibility conditions / darkness 11: 12: 19: 22: 23: 43: 44 45: 46: 47: 48: 50: 51: 52: 53: 54: 55: 56: 57: 58; 59; 60; 61; 62; 63 Runway confusion Adverse weather / poor visibility conditions / darkness Taxiway confusion Emergency landing Lack of adherence to SOP for take-off procedure in terms of maintaining adequate 123 separation on the RWY. Inadvertent deviation from cleared taxi route 131 Lack of English proficiency 132 Incorrect or confusing / misleading ATC instructions 133 Use of non-standard phraseology by pilot and/or controller 134 137 Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements 141 Lack of adherence to SOP for GND movements. Lack of awareness of own position on 142 the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient 143 separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current 144 situation on the airsite or / and aircraft / vehicle proximity 145 Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle 148 driver Flaws in maintenance technician / airworthiness specialist requirements definition 149 process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties Callsign confusion 154 Current airport diagram not reflecting critical changes 155 Takeoff without clearance Landing without clearance 158 Lack of adherence to Rules of the Air - runway used for alternating take-offs and 160 landings Lack of adherence to SOP in terms of ATCO and approach or ground controller 163 communication Unintuitive and / or error prone system manual - ground radar. nadequate certification process and / or flaws in methodology concerning verification 165 of the system / product compliance with requirements - Ground Radar Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Hearback ommitted Lack of adherence to the current technology standards in terms of flight safety 170 supporting systems. Lack of ground radar at the airport. Lack of adherence to SOP in terms of awareness on supporting systems (warning) ground radar. Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition 130 process and/or training methodology 24 TO32B112 45; 46; 47; 48; 50; 51; 11; 12; 19; 22; 23; 43; 44 Adverse weather / poor visibility conditions / darkness 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63 Lack of adherence to ICAO Annex 14 and related documents in terms of airside lights 147 distribution Runway confusion Adverse weather / poor visibility conditions / darkness Taxiway confusion Lack of adherence to SOP for take-off procedure in terms of maintaining adequate 123 separation on the RWY. Inadvertent deviation from cleared taxi route 131 Lack of English proficiency 132 Incorrect or confusing / misleading ATC instructions 133 Use of non-standard phraseology by pilot and/or controller 134 Traffic controller tiredness - Inadequate workload distribution 137



SPIs: System of Code Identifiable precursors No. SPIs: Technology SPIs: Human SPIs: Organisation Organisations Inefficient / confusing TWR traffic control procedures, inefficient management of hot 139 spots Lack of adherence to SOP for GND movements. 141 Lack of adherence to SOP for GND movements. Lack of awareness of own position on 142 the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient 143 separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current 144 situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology 145 Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle 148 driver Flaws in maintenance technician / airworthiness specialist requirements definition 149 process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties 154 Callsign confusion Current airport diagram not reflecting critical changes 155 Takeoff without clearance 157 Landing without clearance 158 Lack of adherence to Rules of the Air - runway used for alternating take-offs and 160 landings Lack of adherence to SOP in terms of ATCO and approach or ground controller 163 communication Unintuitive and / or error prone system manual - ground radar. 164 nadequate certification process and / or flaws in methodology concerning verification 165 of the system / product compliance with requirements - Ground Radar Pilot tiredness - Inadequate workload distribution 167 168 Flaws in pilot requirements definition process and/or training methodology Hearback ommitted Lack of adherence to the current technology standards in terms of flight safety 170 supporting systems. Lack of ground radar at the airport. 171 Lack of adherence to SOP in terms of awareness on supporting systems (warning) ground radar. Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload 129 distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition 130 process and/or training methodology 25 TO32B113 Lack of adherence to ICAO Annex 14 and related documents in terms of nonrestricted 166 11; 12; 19; 22; 23; 43; 44 45; 46; 47; 48; 50; 51; 52; 53; 54; 55; 56; 57; view on airsite from TWR 58; 59; 60; 61; 62; 63 Runway confusion Adverse weather / poor visibility conditions / darkness Taxiway confusion Emergency landing Lack of adherence to SOP for take-off procedure in terms of maintaining adequate 123 separation on the RWY. Inadvertent deviation from cleared taxi route 131 Lack of English proficiency 132 Incorrect or confusing / misleading ATC instructions 133 134 Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution nefficient / confusing TWR traffic control procedures, inefficient management of hot 139 spots Lack of adherence to SOP for GND movements. 141 Lack of adherence to SOP for GND movements. Lack of awareness of own position on 142 the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient 143 separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current 144 situation on the airsite or / and aircraft / vehicle proximity laws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle 148 driver 149 Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties Callsign confusion Current airport diagram not reflecting critical changes 155 Takeoff without clearance 157 Landing without clearance 158 Lack of adherence to Rules of the Air - runway used for alternating take-offs and 160 landings Lack of adherence to SOP in terms of ATCO and approach or ground controller 163 communication Unintuitive and / or error prone system manual - ground radar. 164



SPIs: System of Code Identifiable precursors No. SPIs: Technology SPIs: Human SPIs: Organisation Organisations Inadequate certification process and / or flaws in methodology concerning verification 165 of the system / product compliance with requirements - Ground Radar Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Hearback ommitted 169 Lack of adherence to the current technology standards in terms of flight safety 170 supporting systems. Lack of ground radar at the airport. Lack of adherence to SOP in terms of awareness on supporting systems (warning) -171 ground radar. 129 Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition 130 process and/or training methodology 26 TO32B114 45: 46: 47: 48: 50: 51: Adverse weather / poor visibility conditions / darkness 11: 12: 19: 22: 23: 43: 44 52: 53: 54: 55: 56: 57: 58; 59; 60; 61; 62; 63 Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology 145 Runway confusion Adverse weather / poor visibility conditions / darkness Taxiway confusion Emergency landing Lack of adherence to SOP for take-off procedure in terms of maintaining adequate 123 separation on the RWY. Inadvertent deviation from cleared taxi route 131 Lack of English proficiency 132 Incorrect or confusing / misleading ATC instructions 133 Use of non-standard phraseology by pilot and/or controller 134 Traffic controller tiredness - Inadequate workload distribution 137 Inefficient / confusing TWR traffic control procedures, inefficient management of hot 139 spots Lack of adherence to SOP for GND movements. 141 Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient 143 separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology 145 Lack of or poor communication quality 146 Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle 148 driver Flaws in maintenance technician / airworthiness specialist requirements definition 149 process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Callsign confusion 154 Current airport diagram not reflecting critical changes 155 Takeoff without clearance 157 158 Landing without clearance Lack of adherence to Rules of the Air - runway used for alternating take-offs and 160 landings Lack of adherence to SOP in terms of ATCO and approach or ground controller 163 communication Unintuitive and / or error prone system manual - ground radar. 164 Inadequate certification process and / or flaws in methodology concerning verification 165 of the system / product compliance with requirements - Ground Radar Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Hearback ommitted 169 Lack of adherence to the current technology standards in terms of flight safety 170 supporting systems. Lack of ground radar at the airport. Lack of adherence to SOP in terms of awareness on supporting systems (warning) 171 ground radar. Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload 129 distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition 130 process and/or training methodology 27 TO32B115 ncorrect or confusing / misleading ATC instructions 133 11; 12; 19; 22; 23; 43; 44 45: 46: 47: 48: 50: 51: 52: 53: 54: 55: 56: 57: 58: 59: 60: 61: 62: 63 Use of non-standard phraseology by pilot and/or controller 134 Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology 145 Lack of or poor communication quality 146 Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle 148 driver Runway confusion Adverse weather / poor visibility conditions / darkness Taxiway confusior



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Code	Identifiable precursors Emergency landing	NO.	SPIs: Technology	SPIs: Human	SPIs: Organisation	Organisations
	Lack of adherence to SOP for take-off procedure in terms of maintaining adequate	123				
	separation on the RWY.	123				
	Inadvertent deviation from cleared taxi route	131				
	Lack of English proficiency	132				
	Incorrect or confusing / misleading ATC instructions	133				
	Use of non-standard phraseology by pilot and/or controller	134				
	Traffic controller tiredness - Inadequate workload distribution	137				
	Inefficient / confusing TWR traffic control procedures, inefficient management of hot	139				
	spots					
	Lack of adherence to SOP for GND movements.	141				
	Lack of adherence to SOP for GND movements. Lack of awareness of own position on	142				
	the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient	1/12				
	separation / clearence	143				
	Lack of adherence to SOP for GND movements. Lack of awareness in terms of current	144				
	situation on the airsite or / and aircraft / vehicle proximity					
	Flaws in traffic controller requirements definition process and/or training methodology	145				
	Lack of or poor communication quality	146				
	Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	148				
	driver					
	Flaws in maintenance technician / airworthiness specialist requirements definition	149				
	process and/or training methodology					
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
	distribution	151			+	
	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
	or / and passive contribution to the PF duties	154			+	1
	Callsign confusion Current airport diagram not reflecting critical changes	154			+	
-	Takeoff without clearance	155			+	
	Landing without clearance	158			+	
	Lack of adherence to Rules of the Air - runway used for alternating take-offs and	160			<u> </u>	
	landings					
	Lack of adherence to SOP in terms of ATCO and approach or ground controller	163				
	communication					
	Unintuitive and / or error prone system manual - ground radar.	164				
	Inadequate certification process and / or flaws in methodology concerning verification	165				
	of the system / product compliance with requirements - Ground Radar					
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168				
	Hearback ommitted	169				
	Lack of adherence to the current technology standards in terms of flight safety	170				
	supporting systems. Lack of ground radar at the airport.	474				
	Lack of adherence to SOP in terms of awareness on supporting systems (warning) - ground radar.	171				
	Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	129				
	distribution	123				
	Flaws in vehicle driver / equipment operator / ground agent requirements definition	130				
	process and/or training methodology					
28 TO32B3	not identifiable at the moment				+	
				11; 12; 19; 22; 23;	43; 44	45; 46; 47; 48; 50; 5
				11; 12; 19; 22; 23;	43; 44	
				11; 12; 19; 22; 23;	43; 44	45; 46; 47; 48; 50; 5 52; 53; 54; 55; 56; 5 58; 59; 60; 61; 62; 6
	Runway confusion	1		11; 12; 19; 22; 23;	43; 44	52; 53; 54; 55; 56; 5
	Runway confusion Adverse weather / poor visibility conditions / darkness	1		11; 12; 19; 22; 23;	43; 44	52; 53; 54; 55; 56; 5
	Adverse weather / poor visibility conditions / darkness Taxiway confusion	6 7		11; 12; 19; 22; 23;	43; 44	52; 53; 54; 55; 56; 5
	Adverse weather / poor visibility conditions / darkness Taxiway confusion Emergency landing	6 7 8		11; 12; 19; 22; 23;	43; 44	52; 53; 54; 55; 56; 5
	Adverse weather / poor visibility conditions / darkness Taxiway confusion Emergency landing Lack of adherence to SOP for take-off procedure in terms of maintaining adequate	6 7		11; 12; 19; 22; 23;	43; 44	52; 53; 54; 55; 56;
	Adverse weather / poor visibility conditions / darkness Taxiway confusion Emergency landing Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWY.	6 7 8 123		11; 12; 19; 22; 23;	43; 44	52; 53; 54; 55; 56;
	Adverse weather / poor visibility conditions / darkness Taxiway confusion Emergency landing Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWY. Inadvertent deviation from cleared taxi route	6 7 8 123		11; 12; 19; 22; 23;	43; 44	52; 53; 54; 55; 56;
	Adverse weather / poor visibility conditions / darkness Taxiway confusion Emergency landing Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWY. Inadvertent deviation from cleared taxi route Lack of English proficiency	6 7 8 123 131 132		11; 12; 19; 22; 23;	43; 44	52; 53; 54; 55; 56;
	Adverse weather / poor visibility conditions / darkness Taxiway confusion Emergency landing Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWY. Inadvertent deviation from cleared taxi route Lack of English proficiency Incorrect or confusing / misleading ATC instructions	6 7 8 123 131 132 133		11; 12; 19; 22; 23;	43; 44	52; 53; 54; 55; 56;
	Adverse weather / poor visibility conditions / darkness Taxiway confusion Emergency landing Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWY. Inadvertent deviation from cleared taxi route Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller	6 7 8 123 131 132 133 134		11; 12; 19; 22; 23;	43; 44	52; 53; 54; 55; 56;
	Adverse weather / poor visibility conditions / darkness Taxiway confusion Emergency landing Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWY. Inadvertent deviation from cleared taxi route Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution	6 7 8 123 131 132 133		11; 12; 19; 22; 23;	43; 44	52; 53; 54; 55; 56;
	Adverse weather / poor visibility conditions / darkness Taxiway confusion Emergency landing Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWY. Inadvertent deviation from cleared taxi route Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller	6 7 8 123 131 132 133 134 137		11; 12; 19; 22; 23;	43; 44	52; 53; 54; 55; 56;
	Adverse weather / poor visibility conditions / darkness Taxiway confusion Emergency landing Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWY. Inadvertent deviation from cleared taxi route Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot	6 7 8 123 131 132 133 134 137		11; 12; 19; 22; 23;	43; 44	52; 53; 54; 55; 56;
	Adverse weather / poor visibility conditions / darkness Taxiway confusion Emergency landing Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWY. Inadvertent deviation from cleared taxi route Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	6 7 8 123 131 132 133 134 137		11; 12; 19; 22; 23;	43; 44	52; 53; 54; 55; 56;
	Adverse weather / poor visibility conditions / darkness Taxiway confusion Emergency landing Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWY. Inadvertent deviation from cleared taxi route Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.	6 7 8 123 131 132 133 134 137 139		11; 12; 19; 22; 23;	43; 44	52; 53; 54; 55; 56;
	Adverse weather / poor visibility conditions / darkness Taxiway confusion Emergency landing Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWY. Inadvertent deviation from cleared taxi route Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient	6 7 8 123 131 132 133 134 137 139		11; 12; 19; 22; 23;	43; 44	52; 53; 54; 55; 56;
	Adverse weather / poor visibility conditions / darkness Taxiway confusion Emergency landing Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWY. Inadvertent deviation from cleared taxi route Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence	6 7 8 123 131 132 133 134 137 139 141 142		11; 12; 19; 22; 23;	43; 44	52; 53; 54; 55; 56;
	Adverse weather / poor visibility conditions / darkness Taxiway confusion Emergency landing Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWY. Inadvertent deviation from cleared taxi route Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence	6 7 8 123 131 132 133 134 137 139		11; 12; 19; 22; 23;	43; 44	52; 53; 54; 55; 56;
	Adverse weather / poor visibility conditions / darkness Taxiway confusion Emergency landing Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWY. Inadvertent deviation from cleared taxi route Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity	6 7 8 123 131 132 133 134 137 139 141 142		11; 12; 19; 22; 23;	43; 44	52; 53; 54; 55; 56;
	Adverse weather / poor visibility conditions / darkness Taxiway confusion Emergency landing Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWY. Inadvertent deviation from cleared taxi route Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence	6 7 8 123 131 132 133 134 137 139 141 142		11; 12; 19; 22; 23;	43; 44	52; 53; 54; 55; 56;
	Adverse weather / poor visibility conditions / darkness Taxiway confusion Emergency landing Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWY. Inadvertent deviation from cleared taxi route Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology	6 7 8 123 131 132 133 134 137 139 141 142 143		11; 12; 19; 22; 23;	43; 44	52; 53; 54; 55; 56;
	Adverse weather / poor visibility conditions / darkness Taxiway confusion Emergency landing Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWY. Inadvertent deviation from cleared taxi route Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality	6 7 8 123 131 132 133 134 137 139 141 142 143 144		11; 12; 19; 22; 23;	43; 44	52; 53; 54; 55; 56;
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ground radar. Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Adverse weather / poor visibility conditions / darkness Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Lack of adherence to emergency procedures - RWY collision avoidance 135		Lack of adherence to SOP in terms of awareness on supporting systems (warning) -	171				T
Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Adverse weather / poor visibility conditions / darkness Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Lack of adherence to emergency procedures - RWY collision avoidance 135							
distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Adverse weather / poor visibility controller Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Lack of adherence to emergency procedures - RWY collision avoidance 135			129				1
Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Adverse weather / poor visibility conditions / darkness Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Lack of adherence to emergency procedures - RWY collision avoidance 135		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1				
process and/or training methodology Adverse weather / poor visibility conditions / darkness 6 Incorrect or confusing / misleading ATC instructions 133 Use of non-standard phraseology by pilot and/or controller 134 Lack of adherence to emergency procedures - RWY collision avoidance 135			130		+		+
Adverse weather / poor visibility conditions / darkness 6 Incorrect or confusing / misleading ATC instructions 133 Use of non-standard phraseology by pilot and/or controller 134 Lack of adherence to emergency procedures - RWY collision avoidance 135			130				
Incorrect or confusing / misleading ATC instructions 133 Use of non-standard phraseology by pilot and/or controller 134 Lack of adherence to emergency procedures - RWY collision avoidance 135	-		-		+		+
Use of non-standard phraseology by pilot and/or controller 134 Lack of adherence to emergency procedures - RWY collision avoidance 135			_		+		+
Lack of adherence to emergency procedures - RWY collision avoidance 135				1	+		+
					+		+
rraffic controller tiredness - Inadequate workload distribution 137					+		+
		Trainic controller tiredness - inadequate workload distribution	13/	1			



SPIs: System of Identifiable precursors Code No. SPIs: Technology SPIs: Human SPIs: Organisation Organisations Flaws in traffic controller requirements definition process and/or training methodology 145 Lack of or poor communication quality 146 Lack of adherence to ICAO Annex 14 and related documents in terms of airside lights 147 distribution Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle 148 driver Flaws in maintenance technician / airworthiness specialist requirements definition 149 process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 distribution nadequate certification process and / or flaws in methodology concerning verification 205 of the system / product compliance with requirements - RCWS Lack of adherence to ICAO Annex 14 and related documents in terms of nonrestricted 166 view on airsite from TWR Lack of adherence to SOP in terms of awareness on supporting systems (warning) 156 RIMCAS. Lack of adherence to the current technology standards in terms of flight safety 172 supporting systems. Lack of Runway Conflict Warning System. 30 TO32B12 144 11; 12; 19; 22; 23; 43; 44 45; 46; 47; 48; 50; 51; Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63 Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Runway confusion Adverse weather / poor visibility conditions / darkness Taxiway confusion Emergency landing Lack of adherence to SOP for take-off procedure in terms of maintaining adequate 123 separation on the RWY. Inadvertent deviation from cleared taxi route 131 132 Lack of English proficiency Incorrect or confusing / misleading ATC instructions 133 134 Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution 137 nefficient / confusing TWR traffic control procedures, inefficient management of hot 139 spots Lack of adherence to SOP for GND movements. 141 Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to SOP for GND movements, Lack of awareness in terms of sufficient 143 separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current 144 situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology 145 Lack of or poor communication quality 146 Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle 148 driver Flaws in maintenance technician / airworthiness specialist requirements definition 149 process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties Callsign confusion Current airport diagram not reflecting critical changes 155 Takeoff without clearance 157 Landing without clearance 158 Lack of adherence to Rules of the Air - runway used for alternating take-offs and 160 landings Lack of adherence to SOP in terms of ATCO and approach or ground controller 163 communication Unintuitive and / or error prone system manual - ground radar. 164 Inadequate certification process and / or flaws in methodology concerning verification 165 of the system / product compliance with requirements - Ground Radar Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Hearback ommitted 169 Lack of adherence to the current technology standards in terms of flight safety 170 supporting systems. Lack of ground radar at the airport. Lack of adherence to SOP in terms of awareness on supporting systems (warning) ground radar. Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload 129 distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition 130 process and/or training methodology Adverse weather / poor visibility conditions / darkness Incorrect or confusing / misleading ATC instructions 133 Use of non-standard phraseology by pilot and/or controller 134 Lack of adherence to emergency procedures - RWY collision avoidance 135 Traffic controller tiredness - Inadequate workload distribution 137 laws in traffic controller requirements definition process and/or training methodology 145 Lack of or poor communication quality 146



SPIs: System of Identifiable precursors Code SPIs: Technology SPIs: Human SPIs: Organisation Organisations Lack of adherence to ICAO Annex 14 and related documents in terms of airside lights 147 distribution Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle 148 driver Flaws in maintenance technician / airworthiness specialist requirements definition 149 process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 distribution Inadequate certification process and / or flaws in methodology concerning verification 205 of the system / product compliance with requirements - RCWS Lack of adherence to ICAO Annex 14 and related documents in terms of nonrestricted 166 view on airsite from TWR Lack of adherence to SOP in terms of awareness on supporting systems (warning) 156 RIMCAS. Lack of adherence to the current technology standards in terms of flight safety 172 supporting systems. Lack of Runway Conflict Warning System. 31 TO32B13 45; 46; 47; 48; 50; 51; Lack of adherence to SOP for GND movements. Lack of awareness in terms of current 11; 12; 19; 22; 23; 43; 44 situation on the airsite or / and aircraft / vehicle proximity 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63 Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Runway confusion Adverse weather / poor visibility conditions / darkness Taxiway confusion Emergency landing Lack of adherence to SOP for take-off procedure in terms of maintaining adequate 123 separation on the RWY. Inadvertent deviation from cleared taxi route 131 Lack of English proficiency 132 Incorrect or confusing / misleading ATC instructions 133 Use of non-standard phraseology by pilot and/or controller 134 137 Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot 139 spots Lack of adherence to SOP for GND movements. 141 Lack of adherence to SOP for GND movements. Lack of awareness of own position on 142 the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current 144 situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology 145 Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition 149 process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties Callsign confusion 154 Current airport diagram not reflecting critical changes 155 157 Takeoff without clearance Landing without clearance 158 Lack of adherence to Rules of the Air - runway used for alternating take-offs and 160 landings 163 Lack of adherence to SOP in terms of ATCO and approach or ground controller communication Unintuitive and / or error prone system manual - ground radar. nadequate certification process and / or flaws in methodology concerning verification 165 of the system / product compliance with requirements - Ground Radar Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Hearback ommitted 169 Lack of adherence to the current technology standards in terms of flight safety 170 supporting systems. Lack of ground radar at the airport. Lack of adherence to SOP in terms of awareness on supporting systems (warning) -171 ground radar. Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload 129 distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition 130 process and/or training methodology Adverse weather / poor visibility conditions / darkness 133 Incorrect or confusing / misleading ATC instructions 134 Use of non-standard phraseology by pilot and/or controller Lack of adherence to emergency procedures - RWY collision avoidance 135 Traffic controller tiredness - Inadequate workload distribution 137 Flaws in traffic controller requirements definition process and/or training methodology 145 Lack of or poor communication quality Lack of adherence to ICAO Annex 14 and related documents in terms of airside lights distribution



SPIs: System of Code Identifiable precursors No. SPIs: Technology SPIs: Human **SPIs: Organisation** Organisations Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle 148 driver Flaws in maintenance technician / airworthiness specialist requirements definition 149 process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 nadequate certification process and / or flaws in methodology concerning verification 205 of the system / product compliance with requirements - RCWS Lack of adherence to ICAO Annex 14 and related documents in terms of nonrestricted 166 view on airsite from TWR Lack of adherence to SOP in terms of awareness on supporting systems (warning) 156 RIMCAS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of Runway Conflict Warning System. ESD 36 Code Identifiable Precursors No. Technology Human Organisation System of Organisations Adverse weather / poor visibility conditions / darkness 46; 48; 50; 51; 52; 53; 1 TO36F11111 12; 19; 54; 55; 58; 59; 60; 61; 62; 63 129 Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution 130 Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Lack of adherence to SOP for GND movements. 141 46: 50: 51: 59: 60: 61: 2 TO36F11112 Flaws in ground equipment maintenance process 128 12; 19; 44 62; 63 Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition 130 process and/or training methodology Inadequate certification process and / or flaws in methodology concerning verification 261 of the system / product compliance with requirements - Ground equipment 3 TO36F1112 Adverse weather / poor visibility conditions / darkness 44 46: 48: 50: 51: 52: 53: 12; 19; 54: 55: 59: 60: 62: 63 Flaws in ground equipment maintenance process 128 Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload 129 distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition 130 process and/or training methodology Lack of adherence to SOP for GND movements. 141 Inadequate certification process and / or flaws in methodology concerning verification 261 of the system / product compliance with requirements - Ground equipment 4 TO36F11211 Lack of adherence to SOP for GND movements. Poor execution of parking / docking 138 12; 19; 44 46; 50; 51; 54; 55; 58; /pushback procedure 59; 60; 61; 62; 63 Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 5 TO36F11212 Adverse weather / poor visibility conditions / darkness 12; 19; 44 46: 48: 50: 51: 52: 53: 54: 55: 58: 59: 60: 61: 62; 63 Flaws in ground equipment maintenance process 128 Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload Flaws in vehicle driver / equipment operator / ground agent requirements definition 130 process and/or training methodology 138 Lack of adherence to SOP for GND movements. Poor execution of parking / docking /pushback procedure 6 TO36F1122 46; 48; 50; 51; 59; 60; Adverse weather / poor visibility conditions / darkness 12; 19; 44 61; 62; 63 Taxiway incursion Inadvertent deviation from cleared taxi route 131 Lack of adherence to SOP for GND movements. Lack of awareness of own position on 142 the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of current 144 situation on the airsite or / and aircraft / vehicle proximity Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 7 TO36F1211 Lack of adherence to SOP for GND movements in terms of clearance providing by the 12; 19; 44 46: 50: 51: 52: 53: 59: 127 controller. 60: 61: 62: 63 Traffic controller tiredness - Inadequate workload distribution 137 Flaws in traffic controller requirements definition process and/or training methodology 145 Current airport diagram not reflecting critical changes 8 TO36F1212 Flaws in ground equipment maintenance process 128 12: 19: 44 46; 50; 51; 59; 60; 61; 62; 63 Inadequate certification process and / or flaws in methodology concerning verification 261 of the system / product compliance with requirements - Ground equipment 9 TO36F1213 Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload 129 12; 19; 44 46: 50: 51: 59: 60: 61: 62: 63



SPIs: System of Code Identifiable precursors SPIs: Technology SPIs: Human **SPIs: Organisation** Organisations Flaws in vehicle driver / equipment operator / ground agent requirements definition 130 process and/or training methodology 46; 50; 51; 54; 55; 58; 10 TO36F1214 Lack of adherence to SOP for GND movements in terms of flight crew - ground crew 126 12: 19: 44 59; 60; 61; 62; 63 comunication. Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload 129 distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition 130 process and/or training methodology Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 46; 50; 51; 59; 60; 61; 11 TO36F122 12; 19; Flaws in ground equipment maintenance process 128 62; 63 Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload 129 distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition 130 process and/or training methodology Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of current 144 situation on the airsite or / and aircraft / vehicle proximity Inadequate certification process and / or flaws in methodology concerning verification 261 of the system / product compliance with requirements - Ground equipment 46: 50: 51: 52: 53: 54: 12 TO36F1311 Adverse weather / poor visibility conditions / darkness 12; 19; 44 55: 56: 57: 58: 59: 60: 61; 62; 63 Lack of adherence to SOP for GND movements in terms of clearance providing by the Lack of English proficiency 132 Incorrect or confusing / misleading ATC instructions 133 Use of non-standard phraseology by pilot and/or controller 134 137 Traffic controller tiredness - Inadequate workload distribution Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient 143 separation / clearence Flaws in traffic controller requirements definition process and/or training methodology 145 Lack of or poor communication quality 146 Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle 148 driver 13 TO36F1312 Lack of adherence to SOP for GND movements in terms of marshalling procedure 125 12; 19; 44 46; 50; 51; 52; 53; 59; 60: 62: 63 Flaws in vehicle driver / equipment operator / ground agent requirements definition 130 process and/or training methodology Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload 129 14 TO36F1313 Adverse weather / poor visibility conditions / darkness 12; 19; 44 46; 48; 50; 51; 52; 53; 54: 55: 59: 60: 61: 62: Lack of adherence to SOP for GND movements. Lack of awareness of other traffic 140 movements through listening of ATC communications Lack of adherence to SOP for GND movements. Lack of awareness of own position on 142 the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient 143 separation / clearence Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 15 TO36F1314 46; 48; 50; 51; 54; 55; Adverse weather / poor visibility conditions / darkness 12; 19; 44 59; 60; 61; 62; 63 Inadvertent deviation from cleared taxi route Lack of adherence to SOP for GND movements. Lack of awareness of other traffic 140 movements through listening of ATC communications Lack of adherence to SOP for GND movements. Lack of awareness of own position on 142 the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficien 143 separation / clearence Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 16 TO36F132 12; 19; 46; 48; 50; 51; 52; 53; Adverse weather / poor visibility conditions / darkness 59; 60; 61; 62; 63 Taxiway incursion Inadvertent deviation from cleared taxi route Lack of adherence to SOP for GND movements. Lack of awareness of other traffic 140 movements through listening of ATC communications Lack of adherence to SOP for GND movements. Lack of awareness of own position on 142 the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient 143 separation / clearence Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 17 TO36F1411 12; 19; 46; 48; 50; 51; 52; 53; Adverse weather / poor visibility conditions / darkness 54; 55; 59; 60; 62; 63 Lack of adherence to SOP for GND movements in terms of clearance providing by the 127



Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	Lack of English proficiency	132				
	Incorrect or confusing / misleading ATC instructions	133				
	Use of non-standard phraseology by pilot and/or controller	134				
	Traffic controller tiredness - Inadequate workload distribution	137				
	Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient	143				
	separation / clearence	ـــــ				
	Flaws in traffic controller requirements definition process and/or training methodology	145				
		—				
	Lack of or poor communication quality	146				
	Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	148				
	driver	ــــــ				
18 TO36F1412	Stand confusion	10			44	50; 51; 52; 53; 54;
		┷				59; 60; 61; 62; 63
	Traffic controller tiredness - Inadequate workload distribution	137				
	Lack of adherence to SOP for GND movements. Lack of awareness of own position on	142				
	the airsite and airport topology.					
	Flaws in traffic controller requirements definition process and/or training methodology	145				
		—				
19 TO36F14131	Flaws in manufacturer quality control process - taxiing related control system (e.g.	124	5; 7; 9;	12; 19;	44	46; 50; 51; 54; 55;
	Brake failure)	\perp				59; 60; 61; 62; 63
	Flaws in maintenance technician / airworthiness specialist requirements definition	149				
	process and/or training methodology					
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
	distribution					
	Inadequate certification process and / or flaws in methodology concerning verification	196				
	of the system / product compliance with requirements - marshalling/rolling/taxiing	1			1	
	control related system and components (incl. brake)	1			1	
20 TO36F14132	Flaws in traffic controller requirements definition process and/or training methodology	145		12; 19;	44	46; 51; 54; 55; 58;
		1		1 ' '	1	60; 61; 62; 63
	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151	İ			1 1 1 1 1 1 1
	or / and passive contribution to the PF duties	1				
	Inadequate stall recovery procedure for the aircraft	152		1		1
	Traffic controller tiredness - Inadequate workload distribution	137				
	Lack of adherence to SOP for GND movements.	141				
21 TO36F14133	Lack of adherence to SOP for GND movements.	141		12; 19;	44	46; 51; 59; 60; 61;
21 1030714133	Lack of adherence to SOP for GND movements.	141		12, 19,	44	63
_	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				- 03
		151				
	or / and passive contribution to the PF duties	4.67				
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168		10.10		46 40 50 54 52
22 TO36F14134	Adverse weather / poor visibility conditions / darkness	6		12; 19;	44	46; 48; 50; 51; 52;
						54; 55; 59; 60; 61;
		₩				63
	Lack of adherence to SOP for GND movements in terms of marshalling procedure	125				
	Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	129				
	distribution	┷				
	Flaws in vehicle driver / equipment operator / ground agent requirements definition	130				
	process and/or training methodology	₩				
23 TO36F14141	Adverse weather / poor visibility conditions / darkness	6		12; 19;	44	46; 48; 50; 51; 52;
						54; 55; 59; 60; 61;
		┷				63
	Taxiway incursion	9				
	Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	129				
	distribution					
	Flaws in vehicle driver / equipment operator / ground agent requirements definition	130				
	process and/or training methodology					
	Lack of adherence to SOP for GND movements.	141				
24 TO36F14142	Taxiway incursion	9		12; 19;	44	46; 50; 51; 59; 60;
		1				62; 63
	Flaws in ground equipment maintenance process	128				
	Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	129				
	distribution	1			1	
	Flaws in vehicle driver / equipment operator / ground agent requirements definition	130				
	process and/or training methodology	1			1	
	Inadequate certification process and / or flaws in methodology concerning verification	261				
	of the system / product compliance with requirements - Ground equipment	1			1	
		1			1	
25 TO36F142	Adverse weather / poor visibility conditions / darkness	6		12; 19;	44	46; 48; 50; 51; 59;
		1			1	61; 62; 63
	Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	129				
	distribution	1			1	
1	Flaws in vehicle driver / equipment operator / ground agent requirements definition	130				+
	process and/or training methodology					
	Pilot tiredness - Inadequate workload distribution	167		+		+
+	Flaws in pilot requirements definition process and/or training methodology	168		+	+	+
	Lack of adherence to SOP for GND movements.	141		+	+	+
+1	n	+		+		+
26 TO36B21	not identifiable at that level	+	5. 7. 0.	12; 19;	44	46; 48; 50; 51; 52;
201030821	not identifiable at that level	1	5; 7; 9;	12, 13,	44	
		1			1	54; 55; 56; 57; 58;
	Advanced to the Advanced State of the Advanc	+		+		60; 61; 62; 63
+	Adverse weather / poor visibility conditions / darkness	6	+	+	+	+
	Taxiway incursion	9		+		+
	Stand confusion	10	-	+		+
1	Flaws in manufacturer quality control process - taxiing related control system (e.g.	124				
	Brake failure)			1		



Codo	Identifiable precursors	No	CDIs: Taskaslası	CDIs. Urrasa	SPIs: Organisation	SPIs: System of
Code	Lack of adherence to SOP for GND movements in terms of marshalling procedure	125	SPIs: Technology	SPIs: Human	SPIS: Organisation	Organisations
	Lack of adherence to SOP for GND movements in terms of flight crew - ground crew	126				
	comunication.	120				
		127				+
	Lack of adherence to SOP for GND movements in terms of clearance providing by the	12/				
	controller.	420				
	Flaws in ground equipment maintenance process	128				1
	Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	129				
	distribution					
	Flaws in vehicle driver / equipment operator / ground agent requirements definition	130				
	process and/or training methodology					
	Inadvertent deviation from cleared taxi route	131				
	Lack of English proficiency	132				
	Incorrect or confusing / misleading ATC instructions	133				
	Use of non-standard phraseology by pilot and/or controller	134				
	Traffic controller tiredness - Inadequate workload distribution	137				
	Lack of adherence to SOP for GND movements. Poor execution of parking / docking	138				
	/pushback procedure					
	Lack of adherence to SOP for GND movements. Lack of awareness of other traffic	140				
	movements through listening of ATC communications	1 .0				
	Lack of adherence to SOP for GND movements.	141			+	
		142		+		
	Lack of adherence to SOP for GND movements. Lack of awareness of own position on	142				
	the airsite and airport topology.					
	Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient	143				
	separation / clearence					
	Lack of adherence to SOP for GND movements. Lack of awareness in terms of current	144				
	situation on the airsite or / and aircraft / vehicle proximity					
	Flaws in traffic controller requirements definition process and/or training methodology	145				
		L	<u> </u>		<u> </u>	
	Lack of or poor communication quality	146				
	Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	148				
	driver					
	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				1
	or / and passive contribution to the PF duties					
	Current airport diagram not reflecting critical changes	155				
	Pilot tiredness - Inadequate workload distribution	167				
				+		
	Flaws in pilot requirements definition process and/or training methodology	168				
	Inadequate certification process and / or flaws in methodology concerning verification	196				
	of the system / product compliance with requirements - marshalling/rolling/taxiing	l				
	control related system and components (incl. brake)					
		261				
		261				
	Inadequate certification process and / or flaws in methodology concerning verification	261				
27 TO36B22	Inadequate certification process and / or flaws in methodology concerning verification		5; 7; 9;	12; 19;	44	46; 48; 50; 51; 52
27 TO36B22	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment		5; 7; 9;	12; 19;	44	
27 TO36B22	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment Lack of adherence to SOP for GND movements. Lack of awareness in terms of current		5; 7; 9;	12; 19;	44	54; 55; 56; 57; 58
27 TO36B22	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment Lack of adherence to SOP for GND movements. Lack of awareness in terms of current		5; 7; 9;	12; 19;	44	46; 48; 50; 51; 52; 54; 55; 56; 57; 58; 60; 61; 62; 63
27 TO36B22	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Adverse weather / poor visibility conditions / darkness	144	5; 7; 9;	12; 19;	44	54; 55; 56; 57; 58
27 TO36B22	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Adverse weather / poor visibility conditions / darkness Taxiway incursion	144 6 9	5; 7; 9;	12; 19;	44	54; 55; 56; 57; 58
27 TO36B22	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Adverse weather / poor visibility conditions / darkness Taxiway incursion Stand confusion	144 6 9	5; 7; 9;	12; 19;	44	54; 55; 56; 57; 58
27 TO36B22	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Adverse weather / poor visibility conditions / darkness Taxiway incursion Stand confusion Flaws in manufacturer quality control process - taxiing related control system (e.g.	144 6 9	5; 7; 9;	12; 19;	44	54; 55; 56; 57; 58
27 TO36B22	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Adverse weather / poor visibility conditions / darkness Taxiway incursion Stand confusion Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure)	144 6 9 10 124	5; 7; 9;	12; 19;	44	54; 55; 56; 57; 58
27 TO36B22	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Adverse weather / poor visibility conditions / darkness Taxiway incursion Stand confusion Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure	144 6 9 10 124	5; 7; 9;	12; 19;	44	54; 55; 56; 57; 58
27 TO36B22	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Adverse weather / poor visibility conditions / darkness Taxiway incursion Stand confusion Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure Lack of adherence to SOP for GND movements in terms of flight crew - ground crew	144 6 9 10 124	5; 7; 9;	12; 19;	44	54; 55; 56; 57; 58
27 TO36B22	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Adverse weather / poor visibility conditions / darkness Taxiway incursion Stand confusion Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication.	144 6 9 10 124 125 126	5; 7; 9;	12; 19;	44	54; 55; 56; 57; 58
27 TO36B22	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Adverse weather / poor visibility conditions / darkness Taxiway incursion Stand confusion Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure Lack of adherence to SOP for GND movements in terms of flight crew - ground crew	144 6 9 10 124	5; 7; 9;	12; 19;	44	54; 55; 56; 57; 58
27 TO36B22	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Adverse weather / poor visibility conditions / darkness Taxiway incursion Stand confusion Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication.	144 6 9 10 124 125 126	5; 7; 9;	12; 19;	44	54; 55; 56; 57; 58
27 TO36B22	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Adverse weather / poor visibility conditions / darkness Taxiway incursion Stand confusion Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication. Lack of adherence to SOP for GND movements in terms of clearance providing by the	144 6 9 10 124 125 126	5; 7; 9;	12; 19;	44	54; 55; 56; 57; 58
27 TO36B22	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Adverse weather / poor visibility conditions / darkness Taxiway incursion Stand confusion Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication. Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	144 6 9 10 124 125 126	5; 7; 9;	12; 19;	44	54; 55; 56; 57; 58
27 TO36B22	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Adverse weather / poor visibility conditions / darkness Taxiway incursion Stand confusion Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication. Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Flaws in ground equipment maintenance process Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	144 6 9 10 124 125 126 127	5; 7; 9;	12; 19;	44	54; 55; 56; 57; 58
27 TO36B22	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Adverse weather / poor visibility conditions / darkness Taxiway incursion Stand confusion Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication. Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Flaws in ground equipment maintenance process Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	144 6 9 10 124 125 126 127	5; 7; 9;	12; 19;	44	54; 55; 56; 57; 58
27 TO36B22	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Adverse weather / poor visibility conditions / darkness Taxiway incursion Stand confusion Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication. Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Flaws in ground equipment maintenance process Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition	144 6 9 10 124 125 126 127	5; 7; 9;	12; 19;	44	54; 55; 56; 57; 58
27 TO36B22	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Adverse weather / poor visibility conditions / darkness Taxiway incursion Stand confusion Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication. Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Flaws in ground equipment maintenance process Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	144 6 9 10 124 125 126 127 128 129 130	5; 7; 9;	12; 19;	44	54; 55; 56; 57; 58
27 TO36B22	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Adverse weather / poor visibility conditions / darkness Taxiway incursion Stand confusion Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication. Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Flaws in ground equipment maintenance process Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Inadvertent deviation from cleared taxi route	144 6 9 10 124 125 126 127 128 129 130	5; 7; 9;	12; 19;	44	54; 55; 56; 57; 58
27 TO36B22	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Adverse weather / poor visibility conditions / darkness Taxiway incursion Stand confusion Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication. Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Flaws in ground equipment maintenance process Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Inadvertent deviation from cleared taxi route Lack of English proficiency	144 6 9 10 124 125 126 127 128 129 130 131 132	5; 7; 9;	12; 19;	44	54; 55; 56; 57; 58
27 TO36B22	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Adverse weather / poor visibility conditions / darkness Taxiway incursion Stand confusion Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication. Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Flaws in ground equipment maintenance process Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Inadvertent deviation from cleared taxi route Lack of English proficiency Incorrect or confusing / misleading ATC instructions	144 6 9 10 124 125 126 127 128 129 130 131 132 133	5; 7; 9;	12; 19;	44	54; 55; 56; 57; 58
27 TO36B22	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Adverse weather / poor visibility conditions / darkness Taxiway incursion Stand confusion Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication. Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Flaws in ground equipment maintenance process Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaw in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Inadvertent deviation from cleared taxi route Lack of English proficiency Use of non-standard phraseology by pilot and/or controller	144 6 9 10 124 125 126 127 130 131 132 133 134	5; 7; 9;	12; 19;	44	54; 55; 56; 57; 58
27 TO36B22	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Adverse weather / poor visibility conditions / darkness Taxiway incursion Stand confusion Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication. Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Flaws in ground equipment maintenance process Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Inadvertent deviation from cleared taxi route Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution	144 6 9 10 124 125 127 128 129 130 131 132 133 134 137	5; 7; 9;	12; 19;	44	54; 55; 56; 57; 58
27 TO36B22	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Adverse weather / poor visibility conditions / darkness Taxiway incursion Stand confusion Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication. Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Flaws in ground equipment maintenance process Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Inadvertent deviation from cleared taxi route Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Lack of adherence to SOP for GND movements. Poor execution of parking / docking	144 6 9 10 124 125 126 127 130 131 132 133 134	5; 7; 9;	12; 19;	44	54; 55; 56; 57; 58
27 TO36B22	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Adverse weather / poor visibility conditions / darkness Taxiway incursion Stand confusion Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication. Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Flaws in ground equipment maintenance process Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Inadvertent deviation from cleared taxi route Lack of English proficiency Incorrect or corfusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Lack of adherence to SOP for GND movements. Poor execution of parking / docking / pushback procedure	144 6 9 10 124 125 126 127 128 129 130 131 132 133 134 137 138	5; 7; 9;	12; 19;	44	54; 55; 56; 57; 58
27 TO36B22	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Adverse weather / poor visibility conditions / darkness Taxiway incursion Stand confusion Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication. Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Flaws in ground equipment maintenance process Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Inadvertent deviation from cleared taxi route Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Lack of adherence to SOP for GND movements. Poor execution of parking / docking / pushback procedure Lack of adherence to SOP for GND movements. Lack of awareness of other traffic	144 6 9 10 124 125 127 128 129 130 131 132 133 134 137	5; 7; 9;	12; 19;	44	54; 55; 56; 57; 58
27 TO36B22	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Adverse weather / poor visibility conditions / darkness Taxiway incursion Stand confusion Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication. Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Flaws in ground equipment maintenance process Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Inadvertent deviation from cleared taxi route Lack of English proficiency Incorrect or corfusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Lack of adherence to SOP for GND movements. Poor execution of parking / docking / pushback procedure	144 6 9 10 124 125 126 127 128 129 130 131 132 133 134 137 138	5; 7; 9;	12; 19;	44	54; 55; 56; 57; 58
27 TO36B22	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Adverse weather / poor visibility conditions / darkness Taxiway incursion Stand confusion Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication. Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Flaws in ground equipment maintenance process Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Inadvertent deviation from cleared taxi route Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Lack of adherence to SOP for GND movements. Poor execution of parking / docking / pushback procedure Lack of adherence to SOP for GND movements. Lack of awareness of other traffic	144 6 9 10 124 125 126 127 128 129 130 131 132 133 134 137 138	5; 7; 9;	12; 19;	44	54; 55; 56; 57; 58
27 TO36B22	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Adverse weather / poor visibility conditions / darkness Taxiway incursion Stand confusion Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication. Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Flaws in ground equipment maintenance process Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Lack of adherence to SOP for GND movements. Poor execution of parking / docking /pushback procedure Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications	144 6 9 10 124 125 126 127 128 129 130 131 132 133 134 137 138	5; 7; 9;	12; 19;	44	54; 55; 56; 57; 58
27 TO36B22	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Adverse weather / poor visibility conditions / darkness Taxiway incursion Stand confusion Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication. Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Flaws in ground equipment maintenance process Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Lack of adherence to SOP for GND movements. Poor execution of parking / docking / pushback procedure Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications Lack of adherence to SOP for GND movements.	144 6 9 10 124 125 127 128 129 130 131 132 133 134 137 140 141	5; 7; 9;	12; 19;	44	54; 55; 56; 57; 58
27 TO36B22	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Adverse weather / poor visibility conditions / darkness Taxiway incursion Stand confusion Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication. Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Flaws in ground equipment maintenance process Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Inadvertent deviation from cleared taxi route Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Lack of adherence to SOP for GND movements. Poor execution of parking / docking /pushback procedure Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.	144 6 9 10 124 125 126 127 130 131 132 133 134 137 138 140	5; 7; 9;	12; 19;	44	54; 55; 56; 57; 58
27 TO36B22	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Adverse weather / poor visibility conditions / darkness Taxiway incursion Stand confusion Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication. Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Flaws in ground equipment maintenance process Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Lack of adherence to SOP for GND movements. Poor execution of parking / docking /pushback procedure Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.	144 6 9 10 124 125 126 127 130 131 132 133 134 137 138 140	5; 7; 9;	12; 19;	44	54; 55; 56; 57; 58
27 TO36B22	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Adverse weather / poor visibility conditions / darkness Taxiway incursion Stand confusion Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication. Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Flaws in ground equipment maintenance process Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Inadvertent deviation from cleared taxi route Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Lack of adherence to SOP for GND movements. Poor execution of parking / docking / pushback procedure Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence	144 6 9 10 124 125 126 127 128 129 130 131 133 134 137 138 140 141 142	5; 7; 9;	12; 19;	44	54; 55; 56; 57; 58
27 TO36B22	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Adverse weather / poor visibility conditions / darkness Taxiway incursion Stand confusion Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication. Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Flaws in ground equipment maintenance process Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Inadvertent deviation from cleared taxi route Lack of English proficiency Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Lack of adherence to SOP for GND movements. Poor execution of parking / docking / pushback procedure Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements.	144 6 9 10 124 125 126 127 130 131 132 133 134 137 138 140	5; 7; 9;	12; 19;	44	54; 55; 56; 57; 58
27 TO36B22	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Adverse weather / poor visibility conditions / darkness Taxiway incursion Stand confusion Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication. Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Flaws in ground equipment maintenance process Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Inadvertent deviation from cleared taxi route Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence	144 6 9 124 125 126 127 130 131 132 133 134 137 138 140 141 142	5; 7; 9;	12; 19;	44	54; 55; 56; 57; 58
27 TO36B22	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Adverse weather / poor visibility conditions / darkness Taxiway incursion Stand confusion Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication. Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Flaws in ground equipment maintenance process Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Inadvertent deviation from cleared taxi route Lack of English proficiency Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Lack of adherence to SOP for GND movements. Poor execution of parking / docking / pushback procedure Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements.	144 6 9 124 125 126 127 130 131 132 133 134 137 138 140 141 142	5; 7; 9;	12; 19;	44	54; 55; 56; 57; 58
27 TO36B22	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Adverse weather / poor visibility conditions / darkness Taxiway incursion Stand confusion Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication. Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Flaws in ground equipment maintenance process Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Inadvertent deviation from cleared taxi route Lack of English proficiency Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Lack of adherence to SOP for GND movements. Poor execution of parking / docking / pushback procedure Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence	144 6 9 10 124 125 126 127 130 131 132 133 134 137 140 141 142 143	5; 7; 9;	12; 19;	44	54; 55; 56; 57; 58
27 TO36B22	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Adverse weather / poor visibility conditions / darkness Taxiway incursion Stand confusion Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication. Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Flaws in ground equipment maintenance process Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Inadvertent deviation from cleared taxi route Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence	144 6 9 124 125 126 127 130 131 132 133 134 137 138 140 141 142	5; 7; 9;	12; 19;	44	54; 55; 56; 57; 58
27 TO36B22	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Adverse weather / poor visibility conditions / darkness Taxiway incursion Stand confusion Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication. Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Flaws in ground equipment maintenance process Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Inadvertent deviation from cleared taxi route Lack of English proficiency Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Lack of adherence to SOP for GND movements. Poor execution of parking / docking / pushback procedure Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence	144 6 9 10 124 125 126 127 130 131 132 133 134 137 140 141 142 143	5; 7; 9;	12; 19;	44	54; 55; 56; 57; 58
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27 TO36B22	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Adverse weather / poor visibility conditions / darkness Taxiway incursion Stand confusion Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication. Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Flaws in ground equipment maintenance process Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Inadvertent deviation from cleared taxi route Lack of English proficiency Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Lack of adherence to SOP for GND movements. Poor execution of parking / docking / pushback procedure Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation /	144 6 9 10 124 125 126 127 128 129 130 131 132 133 134 140 141 142 143 144 145	5; 7; 9;	12; 19;	44	54; 55; 56; 57; 58
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SPIs: System of Code Identifiable precursors No. SPIs: Technology SPIs: Human **SPIs: Organisation** Organisations Flaws in pilot requirements definition process and/or training methodology 168 nadequate certification process and / or flaws in methodology concerning verification 196 of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake) Inadequate certification process and / or flaws in methodology concerning verification 261 of the system / product compliance with requirements - Ground equipment 28 TO36B23 Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient 143 5; 7; 9; 12: 19: 44 46: 48: 50: 51: 52: 53: 54; 55; 56; 57; 58; 59; separation / clearence 60: 61: 62: 63 Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Adverse weather / poor visibility conditions / darkness Taxiway incursion Stand confusion 10 Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure 125 Lack of adherence to SOP for GND movements in terms of flight crew - ground crev 126 comunication. Lack of adherence to SOP for GND movements in terms of clearance providing by the 127 controller. Flaws in ground equipment maintenance process 128 Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload 129 distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition 130 process and/or training methodology Inadvertent deviation from cleared taxi route 131 Lack of English proficiency 132 Incorrect or confusing / misleading ATC instructions 133 Use of non-standard phraseology by pilot and/or controller 134 137 Traffic controller tiredness - Inadequate workload distribution Lack of adherence to SOP for GND movements. Poor execution of parking / docking 138 /pushback procedure Lack of adherence to SOP for GND movements. Lack of awareness of other traffic 140 movements through listening of ATC communications Lack of adherence to SOP for GND movements. 141 Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient 143 separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current 144 situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology 145 Lack of or poor communication quality 146 Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle 148 driver Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes 155 Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Inadequate certification process and / or flaws in methodology concerning verification 196 of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake) nadequate certification process and / or flaws in methodology concerning verification 261 of the system / product compliance with requirements - Ground equipment 46; 48; 50; 51; 52; 53; 29 TO36B24 135 5; 7; 9; 12; 19; Lack of adherence to emergency procedures - RWY collision avoidance 54; 55; 56; 57; 58; 59; 60; 61; 62; 63 Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Adverse weather / poor visibility conditions / darkness Taxiway incursion Stand confusion Flaws in manufacturer quality control process - taxiing related control system (e.g. 124 Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure 125 Lack of adherence to SOP for GND movements in terms of flight crew - ground crew 126 comunication. Lack of adherence to SOP for GND movements in terms of clearance providing by the 127 controller. Flaws in ground equipment maintenance process 128 Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload 129 Flaws in vehicle driver / equipment operator / ground agent requirements definition 130 process and/or training methodology Inadvertent deviation from cleared taxi route 131 Lack of English proficiency 132 Incorrect or confusing / misleading ATC instructions 133 Use of non-standard phraseology by pilot and/or controller 134

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Traffic controller tiredness - Inadequate workload distribution



SPIs: System of Code Identifiable precursors No. SPIs: Technology SPIs: Human **SPIs: Organisation** Organisations Lack of adherence to SOP for GND movements. Poor execution of parking / docking 138 /pushback procedure Lack of adherence to SOP for GND movements. Lack of awareness of other traffic 140 movements through listening of ATC communications Lack of adherence to SOP for GND movements. 141 Lack of adherence to SOP for GND movements. Lack of awareness of own position on 142 the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient 143 separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current 144 situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology 145 Lack of or poor communication quality 146 Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle 148 driver Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes 155 Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Inadequate certification process and / or flaws in methodology concerning verification 196 of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake) nadequate certification process and / or flaws in methodology concerning verification 261 of the system / product compliance with requirements - Ground equipment 46: 48: 50: 51: 52: 53: 30 TO36B11 not identifiable on that level 5: 7: 9: 12: 19: 44 54; 55; 56; 57; 58; 59; 60; 61; 62; 63 Adverse weather / poor visibility conditions / darkness Taxiway incursion Stand confusion 10 Flaws in manufacturer quality control process - taxiing related control system (e.g. 124 Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure 125 Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication. Lack of adherence to SOP for GND movements in terms of clearance providing by the 127 controller. Flaws in ground equipment maintenance process 128 Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload 129 Flaws in vehicle driver / equipment operator / ground agent requirements definition 130 process and/or training methodology Inadvertent deviation from cleared taxi route 131 Lack of English proficiency 132 Incorrect or confusing / misleading ATC instructions 133 Use of non-standard phraseology by pilot and/or controller 134 Traffic controller tiredness - Inadequate workload distribution 137 Lack of adherence to SOP for GND movements. Poor execution of parking / docking 138 /pushback procedure Lack of adherence to SOP for GND movements. Lack of awareness of other traffic 140 movements through listening of ATC communications Lack of adherence to SOP for GND movements. 141 Lack of adherence to SOP for GND movements. Lack of awareness of own position on 142 the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient 143 separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current 144 situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology 145 Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle 148 driver Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes 155 Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology 168 nadequate certification process and / or flaws in methodology concerning verification 196 of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake) Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment Lack of adherence to emergency procedures - RWY collision avoidance 135 Lack of adherence to SOP for GND movements, Lack of awareness in terms of sufficient 143 separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current 144 situation on the airsite or / and aircraft / vehicle proximity Pilot tiredness - Inadequate workload distribution 167



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Adverse weather / poor visibility conditions / darkness Taxiway incursion Stand confusion Flaws in manufacturer quality control process - taxiing related control system (e.g. 124 Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication. Lack of adherence to SOP for GND movements in terms of flight crew - ground grew comunication. Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Flaws in ground equipment maintenance process Vehicle driver / equipment operator / ground agent tiredness - inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology lnadvertent deviation from cleared taxi route			130				
Taxiway incursion Stand confusion Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication. Lack of adherence to SOP for GND movements in terms of flight crew - ground grew comunication. Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Flaws in ground equipment maintenance process Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Inadvertent deviation from cleared taxi route			-				
Stand confusion 10 Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure) 125 Lack of adherence to SOP for GND movements in terms of marshalling procedure 125 Lack of adherence to SOP for GND movements in terms of flight crew - ground crew comunication. Lack of adherence to SOP for GND movements in terms of clearance providing by the controller. Flaws in ground equipment maintenance process 128 Vehicle driver / equipment operator / ground agent tiredness - inadequate workload distribution 130 Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Inadvertent deviation from cleared taxi route 131	$-\!\!\!\!-\!\!\!\!\!-$		_				
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Flaws in ground equipment maintenance process Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Inadvertent deviation from cleared taxi route 128 129 130 130		Lack of adherence to SOP for GND movements in terms of clearance providing by the	127				
Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Inadvertent deviation from cleared taxi route 131	$\overline{}$		120		+		
distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Inadvertent deviation from cleared taxi route 131	-				+		
process and/or training methodology Inadvertent deviation from cleared taxi route 131		distribution					
Inadvertent deviation from cleared taxi route 131			130				
	+		131		1		
		Lack of English proficiency					
Incorrect or confusing / misleading ATC instructions 133	$\overline{}$						
Use of non-standard phraseology by pilot and/or controller 134	-				1		
Traffic controller tiredness - Inadequate workload distribution 137		Traffic controller tiredness - Inadequate workload distribution	137	<u> </u>			1



SPIs: System of Code Identifiable precursors No. SPIs: Technology SPIs: Human **SPIs: Organisation** Organisations Lack of adherence to SOP for GND movements. Poor execution of parking / docking 138 /pushback procedure Lack of adherence to SOP for GND movements. Lack of awareness of other traffic 140 movements through listening of ATC communications Lack of adherence to SOP for GND movements. 141 Lack of adherence to SOP for GND movements. Lack of awareness of own position on 142 the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient 143 separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current 144 situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology 145 Lack of or poor communication quality 146 Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle 148 driver Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes Pilot tiredness - Inadequate workload distribution 167 168 Flaws in pilot requirements definition process and/or training methodology Inadequate certification process and / or flaws in methodology concerning verification 196 of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake) nadequate certification process and / or flaws in methodology concerning verification 261 of the system / product compliance with requirements - Ground equipment Lack of adherence to emergency procedures - RWY collision avoidance Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient 143 separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current 144 situation on the airsite or / and aircraft / vehicle proximity Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology 33 TO36B14 Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload 129 5; 7; 9; 12: 19: 44 46: 48: 50: 51: 52: 53: 54: 55: 56: 57: 58: 59: distribution 60; 61; 62; 63 Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Lack of adherence to SOP for GND movements. 141 Adverse weather / poor visibility conditions / darkness Adverse weather / poor visibility conditions / darkness Taxiway incursion Stand confusion Flaws in manufacturer quality control process - taxiing related control system (e.g. 124 Brake failure) Lack of adherence to SOP for GND movements in terms of marshalling procedure 125 Lack of adherence to SOP for GND movements in terms of flight crew - ground crew 126 comunication Lack of adherence to SOP for GND movements in terms of clearance providing by the 127 controller. Flaws in ground equipment maintenance process 128 Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload 129 distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition 130 process and/or training methodology Inadvertent deviation from cleared taxi route 131 Lack of English proficiency 132 Incorrect or confusing / misleading ATC instructions 133 Use of non-standard phraseology by pilot and/or controller 134 Traffic controller tiredness - Inadequate workload distribution Lack of adherence to SOP for GND movements. Poor execution of parking / docking 138 /pushback procedure Lack of adherence to SOP for GND movements. Lack of awareness of other traffic 140 movements through listening of ATC communications Lack of adherence to SOP for GND movements. Lack of adherence to SOP for GND movements. Lack of awareness of own position on 142 the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient 143 separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology 145 Lack of or poor communication quality 146 Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle 148 driver Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes 155 Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 nadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing ontrol related system and components (incl. brake)



Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	Organisations
	Inadequate certification process and / or flaws in methodology concerning verification	261				
	of the system / product compliance with requirements - Ground equipment					
	Lack of adherence to emergency procedures - RWY collision avoidance	135				
		_				
	Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient	143				
	separation / clearence					
	Lack of adherence to SOP for GND movements. Lack of awareness in terms of current	144				
	situation on the airsite or / and aircraft / vehicle proximity					
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168				

Adverse weather / poor visibility conditions / darkness	6		
System failure affecting the operation of primary instruments / displays or standby	26		
instruments			
GPWS / TAWS alert / warning (genuine or spurious)	50		
MSAW warning	51		
Prolonged loss of communications (PLOC) between pilot and controller(s)	53		
Error in preparation of database for FMS	61		
Ground Navigational Aid failure	62		
Inadequate NOTAM information concerning ground navigational aid failure	68		
Inadequate navigational chart	69		
Lack of English proficiency	132		
Lack of adherence to SOP during aircraft storage and / or maintenance in terms of	233		
protecting of critical aircraft systems against contamination			
Use of non-standard phraseology by pilot and/or controller	134		
Traffic controller tiredness - Inadequate workload distribution	137		
Flaws in traffic controller requirements definition process and/or training methodolog	у 145		
Lack of or poor communication quality	146		



SPIs: System of Code Identifiable precursors No. SPIs: Technology SPIs: Human **SPIs: Organisation** Organisations Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle 148 driver Flaws in maintenance technician / airworthiness specialist requirements definition 149 process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes 167 Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology 168 Lack of adherence to the SOP in terms of critical indicators cross-checking Lack of adherence to SARPs included in Annex 14 and related documents in terms of 225 RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). 245 Lack of adherence to SOP in terms of approach and landing Incorrect use of automation - FMS 274 Altimeter setting error 275 Failure to check navigation accuracy before approach nadequate certification process and / or flaws in methodology concerning verification 299 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting 303 systems warning. Navigational aid failure. Flaws in manufacturer quality control process - FMS subsystem and components 306 (autopilot incl.) Lack of adherence to SOP for AIR operations in terms of controller error in approach clearence instruction Not recognized ground Navaids System failure not reflected in NOTAM messages 308 Flaws in aircraft system maintenance process definition - FMS subsystems and 410 components (autopilot incl.) Flaws in aircraft system maintenance process definition - Ground navigational systems 488 and components (e.g. ILS) nadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS) Flaws in manufacturer quality control process - Ground navigational systems and 490 components (e.g. ILS) Flaws in aircraft system maintenance process definition - Onboard navigational system and components nadequate certification process and / or flaws in methodology concerning verification 492 of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and 493 components. Unintuitive and / or error prone system manual - FMS 494 Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Lack of adherence to SOP in terms of approach and landing 245 Flaws in CRM training procedures 263 Lack of adherence to the main CRM rules 264 Imbalanced and inaproppriate relation between cpt and his subordinates 304 43 AL35B3222 nadequate certification process and / or flaws in methodology concerning verification 411 15: 16: 17: 18: 20: 21: 26: 27: 31: 32: 33: 34: 48; 50; 51; 52; 53; 54; 35; 36; 37; 38; 39; 55; 56; 57; 58; 59; 60; of the system / product compliance with requirements - MSAW System 23; 24; 25 61; 62; 63 Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby 26 instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) 53 Error in preparation of database for FMS 61 Ground Navigational Aid failure 62 Inadequate NOTAM information concerning ground navigational aid failure 68 Inadequate navigational chart 132 Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of 233 protecting of critical aircraft systems against contamination 134 Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology 145 Lack of or poor communication quality 146 Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle 148 driver Flaws in maintenance technician / airworthiness specialist requirements definition 149 process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes Pilot tiredness - Inadequate workload distribution 167



Code	Idoutifichle nuceureers	Nia	SPIs: Technology	CDIs: Human	CDIs. Organisation	Organisations
1	Identifiable precursors Flaws in pilot requirements definition process and/or training methodology	168	SPIS: Technology	SPIs: Human	SPIs: Organisation	Organisations
	Lack of adherence to the SOP in terms of critical indicators cross-checking	224				
		225				
	Lack of adherence to SARPs included in Annex 14 and related documents in terms of	225				
	RWY parameters and location, attitude, approach path parameters and obstacles					
	locations (e.g. mountains).	245				
	Lack of adherence to SOP in terms of approach and landing	245				
	Incorrect use of automation - FMS	269				
	Altimeter setting error	274				
	Failure to check navigation accuracy before approach	275				
	Inadequate certification process and / or flaws in methodology concerning verification	299				
	of the system / product compliance with requirements - FMS subsystems and					
	components (autopilot incl.)					
	Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting	303				
	systems warning. Navigational aid failure.					
	Flaws in manufacturer quality control process - FMS subsystem and components	306				
	(autopilot incl.)					
	Lack of adherence to SOP for AIR operations in terms of controller error in approach	307				
	clearence instruction					
	Not recognized ground Navaids System failure not reflected in NOTAM messages	308				
	Flaws in aircraft system maintenance process definition - FMS subsystems and	410				
	components (autopilot incl.)					
	Flaws in aircraft system maintenance process definition - Ground navigational systems	488				
	and components (e.g. ILS)					
	Inadequate certification process and / or flaws in methodology concerning verification	489				
	of the system / product compliance with requirements - Ground navigational systems					
	and components (e.g. ILS)	L		<u> </u>	<u> </u>	
	Flaws in manufacturer quality control process - Ground navigational systems and	490				
1	components (e.g. ILS)					
	Flaws in aircraft system maintenance process definition - Onboard navigational systems	491				
1	and components					
		492				
1	of the system / product compliance with requirements - Onboard navigational systems	~				
	and components.					
	Flaws in manufacturer quality control process - Onboard navigational systems and	493				
	components.					
	Unintuitive and / or error prone system manual - FMS	494				
	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
	or / and passive contribution to the PF duties	131				
		167				
	Pilot tiredness - Inadequate workload distribution	-				
	Flaws in pilot requirements definition process and/or training methodology	168				
	Lack of adherence to SOP in terms of approach and landing	245			1	-
	Flaws in CRM training procedures	263				
	Flaws in CRM training procedures Lack of adherence to the main CRM rules	263 264				
	Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates	263 264 304				
44 AL35B3223	Flaws in CRM training procedures Lack of adherence to the main CRM rules	263 264 304	3;	15; 16; 17; 18; 20; 21;	26; 27; 31; 32; 33; 34;	48; 50; 51; 52; 53;
44 AL35B3223	Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates	263 264 304	3;	15; 16; 17; 18; 20; 21; 23; 24; 25	26; 27; 31; 32; 33; 34; 35; 36; 37; 38; 39;	55; 56; 57; 58; 59;
44 AL35B3223	Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates MSAW warning	263 264 304 51	3;			48; 50; 51; 52; 53; 55; 56; 57; 58; 59; 61; 62; 63
44 AL35B3223	Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates MSAW warning Traffic controller tiredness - Inadequate workload distribution	263 264 304 51	3;			55; 56; 57; 58; 59;
44 AL35B3223	Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates MSAW warning	263 264 304 51	3;			55; 56; 57; 58; 59;
44 AL35B3223	Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates MSAW warning Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology	263 264 304 51 137 145	3;			55; 56; 57; 58; 59;
44 AL35B3223	Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates MSAW warning Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting	263 264 304 51	3;			55; 56; 57; 58; 59;
44 AL35B3223	Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates MSAW warning Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. MSAW warning.	263 264 304 51 137 145 495	3;			55; 56; 57; 58; 59;
44 AL35B3223	Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates MSAW warning Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting	263 264 304 51 137 145 495	3;			55; 56; 57; 58; 59;
44 AL35B3223	Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates MSAW warning Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. MSAW warning. Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby	263 264 304 51 137 145 495	3;			55; 56; 57; 58; 59;
44 AL35B3223	Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates MSAW warning Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. MSAW warning. Adverse weather / poor visibility conditions / darkness	263 264 304 51 137 145 495	3;			55; 56; 57; 58; 59;
44 AL35B3223	Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates MSAW warning Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. MSAW warning. Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious)	263 264 304 51 137 145 495 6 26	3;			55; 56; 57; 58; 59;
44 AL35B3223	Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates MSAW warning Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. MSAW warning. Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning	263 264 304 51 137 145 495 6 26 50 51	3;			55; 56; 57; 58; 59;
44 AL35B3223	Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates MSAW warning Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. MSAW warning. Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s)	263 264 304 51 137 145 495 6 26	3;			55; 56; 57; 58; 59;
44 AL35B3223	Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates MSAW warning Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. MSAW warning. Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning	263 264 304 51 137 145 495 6 26 50 51	3;			55; 56; 57; 58; 59;
44 AL35B3223	Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates MSAW warning Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. MSAW warning. Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s)	263 264 304 51 137 145 495 6 26 50 51 53	3;			55; 56; 57; 58; 59;
44 AL35B3223	Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates MSAW warning Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. MSAW warning. Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS	263 264 304 51 137 145 495 6 6 26 50 51 53 61	3;			55; 56; 57; 58; 59;
44 AL35B3223	Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates MSAW warning Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. MSAW warning. Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure	263 264 304 51 137 145 495 6 26 50 51 53 61 62	3;			55; 56; 57; 58; 59;
44 AL35B3223	Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates MSAW warning Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. MSAW warning. Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure	263 264 304 51 137 145 495 6 26 50 51 53 61 62 68	3;			55; 56; 57; 58; 59;
44 AL35B3223	Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates MSAW warning Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. MSAW warning. Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning MSAW warning Frolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate NOTAM information concerning ground navigational aid failure	263 264 304 51 145 495 6 26 50 51 53 61 62 68 69	3;			55; 56; 57; 58; 59;
44 AL35B3223	Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates MSAW warning Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. MSAW warning. Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency	263 264 304 51 145 495 6 26 50 51 53 61 62 68 69 132	3;			55; 56; 57; 58; 59;
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44 AL35B3223	Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates MSAW warning Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. MSAW warning. Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition	263 264 304 51 137 145 495 6 26 50 51 53 61 62 68 69 132 233 134 137 145	3;			55; 56; 57; 58; 59;
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44 AL35B3223	Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates MSAW warning Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. MSAW warning. Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes	263 264 304 51 137 145 6 26 50 51 53 61 62 68 69 132 233 134 137 145 149 150	3;			55; 56; 57; 58; 59;
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44 AL35B3223	Flaws in CRM training procedures Lack of adherence to the main CRM rules Imbalanced and inaproppriate relation between cpt and his subordinates MSAW warning Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting systems warning. MSAW warning. Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby instruments GPWS / TAWS alert / warning (genuine or spurious) MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) Error in preparation of database for FMS Ground Navigational Aid failure Inadequate NOTAM information concerning ground navigational aid failure Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	263 264 304 51 137 145 6 26 50 51 53 61 62 68 69 132 233 145 145 146 148 150 151 155 167 168 224	3;			55; 56; 57; 58; 59;
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\exists	Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
\equiv		Lack of adherence to SOP in terms of approach and landing	245	<u> </u>			
		Incorrect use of automation - FMS	269				
		Altimeter setting error	274				
		Failure to check navigation accuracy before approach	275				
		Inadequate certification process and / or flaws in methodology concerning verification	299				
		of the system / product compliance with requirements - FMS subsystems and					
\rightarrow		components (autopilot incl.)	╙				
		Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting	303				
\rightarrow		systems warning. Navigational aid failure.	ـــــ				
		Flaws in manufacturer quality control process - FMS subsystem and components	306				
\rightarrow		(autopilot incl.)					
		Lack of adherence to SOP for AIR operations in terms of controller error in approach	307				
\rightarrow		clearence instruction Not recognized ground Navaids System failure not reflected in NOTAM messages	308				
\rightarrow		Flaws in aircraft system maintenance process definition - FMS subsystems and	410				
		components (autopilot incl.)	410				
\rightarrow		Flaws in aircraft system maintenance process definition - Ground navigational systems	488				
		and components (e.g. ILS)	400				
-+		Inadequate certification process and / or flaws in methodology concerning verification	489				
		of the system / product compliance with requirements - Ground navigational systems	100				
		and components (e.g. ILS)					
-		Flaws in manufacturer quality control process - Ground navigational systems and	490				
		components (e.g. ILS)					
-		Flaws in aircraft system maintenance process definition - Onboard navigational systems	491	 			
		and components					
		Inadequate certification process and / or flaws in methodology concerning verification	492				1
		of the system / product compliance with requirements - Onboard navigational systems	1				
		and components.	1				
		Flaws in manufacturer quality control process - Onboard navigational systems and	493				
		components.					
\neg		Unintuitive and / or error prone system manual - FMS	494				
		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
		or / and passive contribution to the PF duties					
		Pilot tiredness - Inadequate workload distribution	167				
		Flaws in pilot requirements definition process and/or training methodology	168				
		Lack of adherence to SOP in terms of approach and landing	245				
		Flaws in CRM training procedures	263				
		Lack of adherence to the main CRM rules	264				
		Imbalanced and inaproppriate relation between cpt and his subordinates	304				
45 A	AL35B33	Traffic controller tiredness - Inadequate workload distribution	137	3;	15; 16; 17; 18; 20; 21; 23; 24; 25	26; 27; 31; 32; 33; 34; 35; 36; 37; 38; 39;	48; 50; 51; 52; 53; 54 55; 56; 57; 58; 59; 60 61; 62; 63
		Flaws in traffic controller requirements definition process and/or training methodology	145				
		Pilot tiredness - Inadequate workload distribution	167				
		Flaws in pilot requirements definition process and/or training methodology	168				
		Late or inadequate response to MSAW warning	286				
		Adverse weather / poor visibility conditions / darkness	6				
		System failure affecting the operation of primary instruments / displays or standby	26				
		instruments	ـــــ				
		GPWS / TAWS alert / warning (genuine or spurious)	50				
_		MSAW warning	51				
		Prolonged loss of communications (PLOC) between pilot and controller(s)	53				
		Error in preparation of database for FMS	61				
-		Ground Navigational Aid failure	62				
- 1		Inadequate NOTAM information concerning ground navigational aid failure	68		i	†	
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\Rightarrow		Inadequate navigational chart	69				
\equiv		Lack of English proficiency	132				
\mp		Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of					
		Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination	132 233				
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		Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution	132 233 134 137				
		Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller	132 233 134 137				
		Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology	132 233 134 137 145				
		Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality	132 233 134 137 145				
		Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	132 233 134 137 145				
		Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	132 233 134 137 145 146 148				
		Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition	132 233 134 137 145				
		Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	132 233 134 137 145 146 148				
		Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition	132 233 134 137 145 146 148				
		Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	132 233 134 137 145 146 148				
		Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	132 233 134 137 145 146 148 149				
		Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	132 233 134 137 145 146 148 149				
		Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	132 233 134 137 145 146 148 149 150				
		Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes	132 233 134 137 145 146 148 149 150				
		Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes Pilot tiredness - Inadequate workload distribution	132 233 134 137 145 146 148 149 150 151				
		Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	132 233 134 137 145 146 148 149 150 151 155 167 168				
		Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to the SOP in terms of critical indicators cross-checking	132 233 134 137 145 146 148 149 150 151 155 167 168 224				
		Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to the SOP in terms of critical indicators cross-checking Lack of adherence to SARPs included in Annex 14 and related documents in terms of	132 233 134 137 145 146 148 149 150 151 155 167 168 224				
		Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SAPS included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles	132 233 134 137 145 146 148 149 150 151 155 167 168 224				
		Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to the SOP in terms of critical indicators cross-checking Lack of adherence to SARPs included in Annex 14 and related documents in terms of RMVy parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).	132 233 134 137 145 146 148 150 151 155 167 168 224 225				
		Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to the SOP in terms of critical indicators cross-checking Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). Lack of adherence to SOP in terms of approach and landing	132 233 134 137 145 146 149 150 151 155 167 168 224 225				



SPIs: System of Code Identifiable precursors No. SPIs: Technology SPIs: Human SPIs: Organisation Organisations Inadequate certification process and / or flaws in methodology concerning verification 299 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting 303 systems warning. Navigational aid failure. Flaws in manufacturer quality control process - FMS subsystem and components 306 (autopilot incl.) Lack of adherence to SOP for AIR operations in terms of controller error in approach 307 clearence instruction Not recognized ground Navaids System failure not reflected in NOTAM messages 308 Flaws in aircraft system maintenance process definition - FMS subsystems and 410 components (autopilot incl.) Flaws in aircraft system maintenance process definition - Ground navigational systems 488 and components (e.g. ILS) Inadequate certification process and / or flaws in methodology concerning verification 489 of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS) Flaws in manufacturer quality control process - Ground navigational systems and 490 omponents (e.g. ILS) Flaws in aircraft system maintenance process definition - Onboard navigational system: 491 and components nadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and 493 components. Unintuitive and / or error prone system manual - FMS Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Lack of adherence to SOP in terms of approach and landing 245 Flaws in CRM training procedures 263 264 Lack of adherence to the main CRM rules mbalanced and inaproppriate relation between cpt and his subordinates 304 GPWS failure 46 AL35B11 48; 50; 51; 52; 53; 54; 293 3; 15; 16; 17; 18; 20; 21; 26; 27; 31; 32; 33; 34; Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS 23: 24: 25 35; 36; 37; 38; 39; 55: 56: 57: 58: 59: 60: 61; 62; 63 Adverse weather / poor visibility conditions / darkness System failure affecting the operation of primary instruments / displays or standby 26 instruments GPWS / TAWS alert / warning (genuine or spurious) 50 MSAW warning Prolonged loss of communications (PLOC) between pilot and controller(s) 53 Error in preparation of database for FMS 61 Ground Navigational Aid failure 62 Inadequate NOTAM information concerning ground navigational aid failure 68 69 Inadequate navigational chart Lack of English proficiency Lack of adherence to SOP during aircraft storage and / or maintenance in terms of 233 protecting of critical aircraft systems against contamination Use of non-standard phraseology by pilot and/or controller 134 137 Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology 145 Lack of or poor communication quality 146 Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle 148 driver 149 Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Lack of adherence to the SOP in terms of critical indicators cross-checking 224 Lack of adherence to SARPs included in Annex 14 and related documents in terms of 225 RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). Lack of adherence to SOP in terms of approach and landing 245 Incorrect use of automation - FMS 269 Altimeter setting error 274 Failure to check navigation accuracy before approach 275 nadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting 303 systems warning. Navigational aid failure. Flaws in manufacturer quality control process - FMS subsystem and components 306 (autopilot incl.) Lack of adherence to SOP for AIR operations in terms of controller error in approach 307 learence instruction



Code	Identifiable precursors	No	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
Code	Not recognized ground Navaids System failure not reflected in NOTAM messages	308	3FIS. Technology	Jris. Huillali	3F13. Organisation	Organisations
	Flaws in aircraft system maintenance process definition - FMS subsystems and	410	-	+		
	components (autopilot incl.)	1.10				
	Flaws in aircraft system maintenance process definition - Ground navigational systems	488				
	and components (e.g. ILS)					
	Inadequate certification process and / or flaws in methodology concerning verification	489				
	of the system / product compliance with requirements - Ground navigational systems					
	and components (e.g. ILS)					
	Flaws in manufacturer quality control process - Ground navigational systems and	490				
	components (e.g. ILS)					
	Flaws in aircraft system maintenance process definition - Onboard navigational systems	491				
	and components	1.0-				
	Inadequate certification process and / or flaws in methodology concerning verification	492				
	of the system / product compliance with requirements - Onboard navigational systems					
	and components.					
	Flaws in manufacturer quality control process - Onboard navigational systems and	493				
	components.					
	Unintuitive and / or error prone system manual - FMS	494				
	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
	or / and passive contribution to the PF duties	-				
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168				
	Lack of adherence to SOP in terms of approach and landing	245				
	Flaws in CRM training procedures	263		1		
	Lack of adherence to the main CRM rules	264	†	+		
	Imbalanced and inaproppriate relation between cpt and his subordinates	304	1	1		
+	Adverse weather / poor visibility conditions / darkness	6	†	+		1
+	MSAW warning	51	+	+		1
+	Natural or artificial obstacle on runway course	60	+	+		+
+	Traffic controller tiredness - Inadequate workload distribution	137	+	+		+
+	Flaws in traffic controller requirements definition process and/or training methodology	_	 	+		+
		143				
+	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151	 	+		+
	or / and passive contribution to the PF duties	131				
+	Pilot tiredness - Inadequate workload distribution	167		+		+
_	Flaws in pilot requirements definition process and/or training methodology	168		+		
		245		+		
	Lack of adherence to SOP in terms of approach and landing Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high	278		+		+
	terrain)	2/6				
	,	281		+		
	Premature descent to DA(H) before G/S intercept or premature descent to MDA(H)	281				
	before final-descent-point / FAF			+		
	Premature descent below MDA(H) before reaching the visual-descent-point (VDP)	282		+		
	Flight below desired flight path during initial and/or final approach	283				
	Continued approach, when below DA(H) or MDA(H), after loss of visual references	284				
	Late or inadequate response to MSAW warning	286				
	Failure to go-around, when so required	289				
	Failure to follow published missed-approach procedure	291				
	Lack of adherence to SARPs included in Annex 14 and related documents in terms of	295				
	RWY parameters and location, approach path parameters and obstacles locations.					
	Lack of adherence to the current technology standards in terms of flight safety	302				
	supporting systems. Lack of MSAW system.					
		411				
	of the system / product compliance with requirements - MSAW System	_				
	Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting	495				
	systems warning. MSAW warning.	_				1
47 AL35B12	Flaws in maintenance technician / airworthiness specialist requirements definition	149	3;	15; 16; 17; 18; 20; 21;	26; 27; 31; 32; 33; 34;	48; 50; 51; 52; 53;
	process and/or training methodology	1		23; 24; 25	35; 36; 37; 38; 39;	55; 56; 57; 58; 59;
		_				61; 62; 63
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				1
	distribution	_				
	Flaws in aircraft system maintenance process definition - GPWS system components	485				
	Inadequate certification process and / or flaws in methodology concerning verification	486				
	of the system / product compliance with requirements - GPWS system components	1				1
		_				
	Flaws in manufacturer quality control process - GPWS system components	487				
	Adverse weather / poor visibility conditions / darkness	6				
	System failure affecting the operation of primary instruments / displays or standby	26				
	instruments	\perp				
	GPWS / TAWS alert / warning (genuine or spurious)	50				
	MSAW warning	51				
	Prolonged loss of communications (PLOC) between pilot and controller(s)	53				
	Error in preparation of database for FMS	61				
	Ground Navigational Aid failure	62				
	Inadequate NOTAM information concerning ground navigational aid failure	68				1
	Inadequate navigational chart	69	1	1		1
	Lack of English proficiency	132				
	Lack of adherence to SOP during aircraft storage and / or maintenance in terms of	233				
	protecting of critical aircraft systems against contamination	1				1
	Use of non-standard phraseology by pilot and/or controller	134	+	+		
	Traffic controller tiredness - Inadequate workload distribution	137	+	+		
	Flaws in traffic controller requirements definition process and/or training methodology	_	+	+		+
1	naws in Game controller requirements definition process and/or training methodology	143				1
		-	+	+	1	+
	Lack of or poor communication quality	1/16				
	Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	146 148		+		+

systems warning. MSAW warning

Linking of precursors and SPIs



SPIs: System of Code Identifiable precursors SPIs: Technology SPIs: Human **SPIs: Organisation** Organisations Flaws in maintenance technician / airworthiness specialist requirements definition 149 process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Current airport diagram not reflecting critical changes Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Lack of adherence to the SOP in terms of critical indicators cross-checking 224 Lack of adherence to SARPs included in Annex 14 and related documents in terms of 225 RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). Lack of adherence to SOP in terms of approach and landing 245 269 Incorrect use of automation - FMS 274 Altimeter setting error Failure to check navigation accuracy before approach nadequate certification process and / or flaws in methodology concerning verification 299 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting 303 systems warning. Navigational aid failure. Flaws in manufacturer quality control process - FMS subsystem and components 306 (autopilot incl.) Lack of adherence to SOP for AIR operations in terms of controller error in approach 307 clearence instruction Not recognized ground Navaids System failure not reflected in NOTAM messages 308 Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.) Flaws in aircraft system maintenance process definition - Ground navigational systems 488 and components (e.g. ILS) Inadequate certification process and / or flaws in methodology concerning verification 489 of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS) Flaws in manufacturer quality control process - Ground navigational systems and 490 components (e.g. ILS) Flaws in aircraft system maintenance process definition - Onboard navigational systems 491 and components nadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and 493 components. Unintuitive and / or error prone system manual - FMS Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Lack of adherence to SOP in terms of approach and landing 245 Flaws in CRM training procedures 263 Lack of adherence to the main CRM rules 264 Imbalanced and inaproppriate relation between cpt and his subordinates 304 Adverse weather / poor visibility conditions / darkness MSAW warning Natural or artificial obstacle on runway course 60 Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodolog 145 Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology 168 Lack of adherence to SOP in terms of approach and landing 245 Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high 278 terrain) Premature descent to DA(H) before G/S intercept or premature descent to MDA(H) before final-descent-point / FAF Premature descent below MDA(H) before reaching the visual-descent-point (VDP) 282 Flight below desired flight path during initial and/or final approach 283 Continued approach, when below DA(H) or MDA(H), after loss of visual references 284 Late or inadequate response to MSAW warning 286 Failure to go-around, when so required Failure to follow published missed-approach procedure 291 Lack of adherence to SARPs included in Annex 14 and related documents in terms of 295 RWY parameters and location, approach path parameters and obstacles locations 302 Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of MSAW system. nadequate certification process and / or flaws in methodology concerning verification 411 of the system / product compliance with requirements - MSAW System Lack of adherence to SOP. Lack of awareness and immidiate answer on supporting 495



			1				1
	Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
ESD 5	Code	Identifiable Precursors	No.	Technology	Human	Organisation	System of Organisations
1	TO05B111	incorrect configuration Pilot tiredness - Inadequate workload distribution	167		13; 22;	38; 41;	50; 51; 54; 55; 58; 5
					,		60; 61; 62; 63
		Flaws in pilot requirements definition process and/or training methodology	168				
		Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.	198				
		Incorrect stab-trim setting	258				
_	T0050443	Undetected incorrect takeoff configuration	259		42.22	20.44	50; 51; 54; 55; 58; 5
	TO05B112	Pilot tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	167 151		13; 22;	38; 41;	60; 61; 62; 63
		or / and passive contribution to the PF duties					
_	T005043	Flaws in pilot requirements definition process and/or training methodology	168		42.22	20.44	50; 51; 54; 55; 58; 5
3	TO05B12	Unintuitive and / or error prone system manual - FMC	217		13; 22;	38; 41;	60; 61; 62; 63
		Pilot tiredness - Inadequate workload distribution	167				00, 01, 02, 03
		Flaws in pilot requirements definition process and/or training methodology	168				
4	TO05B21	Pilot tiredness - Inadequate workload distribution	167		13; 22;	38; 41;	50; 51; 54; 55; 58; 5 60; 61; 62; 63
		Flaws in pilot requirements definition process and/or training methodology	168				00, 01, 02, 03
		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
		or / and passive contribution to the PF duties	201	 			-
		Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201				
5	TO05B22	Pilot tiredness - Inadequate workload distribution	167		13; 22;	38; 41;	50; 51; 54; 55; 58; 5
					1		60; 61; 62; 63
_	TO05B311	Flaws in pilot requirements definition process and/or training methodology Inadequate certification process and / or flaws in methodology concerning verification	168 229	2.	13; 22;	38; 41;	50; 51; 54; 55; 58;
C	10028311	of the system / product compliance with requirements - TOCW System	229	3;	13; 22;	38; 41;	60; 61; 62; 63
		Flaws in manufacturer quality control process - TOCW system components	222				, . , . ,
		System failure affecting aircraft configuration, controllability and/or flying qualities	25				
		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151				
		Unintuitive and / or error prone system manual - ground radar.	164				+
		Unintuitive and / or error prone system manual - FMC	217				
		Flaws in pilot requirements definition process and/or training methodology	168				
		Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.	198				
		Lack of adherence to SOP for take-off procedure in terms of checking take-off	201				
		configuration before application of take-off power.					
		Incorrect stab-trim setting	258				
7	TO05B312	Undetected incorrect takeoff configuration Flaws in maintenance technician / airworthiness specialist requirements definition	259 149	3:	13; 22;	38; 41;	50; 51; 54; 55; 58; 5
		process and/or training methodology		-,	,		60; 61; 62; 63
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
		distribution Flaws in aircraft system maintenance process definition - TOCW System	204		_		+
		System failure affecting aircraft configuration, controllability and/or flying qualities	25				+
		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
		or / and passive contribution to the PF duties	247				
		Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution	217 167		+		+
		Flaws in pilot requirements definition process and/or training methodology	168				
		Lack of adherence to SOP for take-off procedure in terms of determining of aircraft	198				
	-	configuration.	201	-	+		
		Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201		1		
		Incorrect stab-trim setting	258				
		Undetected incorrect takeoff configuration	259				
8	TO05B313	Incorrect use of automation - TOCW System	192		13; 22;	38; 41;	50; 51; 54; 55; 58; 56; 60; 61; 62; 63
		Pilot tiredness - Inadequate workload distribution	167				00, 01, 02, 03
		Flaws in pilot requirements definition process and/or training methodology	168				
		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
	-	or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - TOCW	219				
		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151	<u> </u>			1
		or / and passive contribution to the PF duties					
		Unintuitive and / or error prone system manual - FMC	217		_		
		Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168	-			+
		Lack of adherence to SOP for take-off procedure in terms of determining of aircraft	198				1
		configuration.					
		Lack of adherence to SOP for take-off procedure in terms of checking take-off	201				
	-	configuration before application of take-off power. Incorrect stab-trim setting	258				
		Undetected incorrect takeoff configuration	259				
9	TO05B321	Flaws in manufacturer quality control process - Power supply system components	238	2;	13; 22;	38; 41;	50; 51; 54; 55; 58;
		Inadequate cartification process and I an flavor in most of the second o	220	 	1		60; 61; 62; 63
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system	230		1		1
		components	1				



							SPIs: System of
C	ode	Identifiable precursors		SPIs: Technology	SPIs: Human	SPIs: Organisation	Organisations
		System failure affecting the operation of primary instruments / displays or standby instruments	26				
+		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
		or / and passive contribution to the PF duties					
+		Unintuitive and / or error prone system manual - FMC	217 167				
+		Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	168				
		Lack of adherence to SOP for take-off procedure in terms of determining of aircraft	198				
4		configuration.					
		Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201				
+		Incorrect stab-trim setting	258				
		Undetected incorrect takeoff configuration	259				
10 TO	D05B322	Flaws in maintenance technician / airworthiness specialist requirements definition	149	2;	13; 22;	38; 41;	50; 51; 54; 55; 58;
+		process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				60; 61; 62; 63
		distribution	130				
		Flaws in aircraft system maintenance process definition - Electrical wiring System	252				
		System failure affecting the operation of primary instruments / displays or standby instruments	26				
+		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151	 			
\perp		or / and passive contribution to the PF duties	L				
T		Unintuitive and / or error prone system manual - FMC	217				
+		Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168	 	+		+
+		Lack of adherence to SOP for take-off procedure in terms of determining of aircraft	198	<u> </u>			
\perp		configuration.					
		Lack of adherence to SOP for take-off procedure in terms of checking take-off	201				
+		configuration before application of take-off power. Incorrect stab-trim setting	258				
+		Undetected incorrect takeoff configuration	259				
11 TO	D05B33	not identifiable at the moment			13; 22;	38; 41;	50; 51; 54; 55; 58;
+		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				60; 61; 62; 63
		or / and passive contribution to the PF duties	131				
		Unintuitive and / or error prone system manual - FMC	217				
_		Pilot tiredness - Inadequate workload distribution	167				
+		Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft	168 198		_		
		configuration.	130				
		Lack of adherence to SOP for take-off procedure in terms of checking take-off	201				
\perp		configuration before application of take-off power.					
+		Incorrect stab-trim setting Undetected incorrect takeoff configuration	258 259				
12 T	O05B411	Cautions / warnings (genuine or spurious) that may lead to a low-speed or high-speed	46		13; 22;	38; 41;	50; 51; 54; 55; 58;
_		rejected take-off					60; 61; 62; 63
		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151				
+		Pilot tiredness - Inadequate workload distribution	167		+		
		Flaws in pilot requirements definition process and/or training methodology	168				
		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207				
+		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
		or / and passive contribution to the PF duties	151				
1		Unintuitive and / or error prone system manual - FMC	217				
+		Pilot tiredness - Inadequate workload distribution	167	-			
+		Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft	168 198	 	+		
╧		configuration.					
Т		Lack of adherence to SOP for take-off procedure in terms of checking take-off	201				
+		configuration before application of take-off power. Incorrect stab-trim setting	258	-	+		+
+		Undetected incorrect takeoff configuration	258				
	D05B412	Cautions / warnings (genuine or spurious) that may lead to a low-speed or high-speed	46		13; 22;	38; 41;	50; 51; 54; 55; 58;
13 TC		rejected take-off	10-	-	+		60; 61; 62; 63
13 TO		Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168	+	+		+
13 TO		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207				
13 TO		roof application of 170 & 110 procedure, dancience to 301, criteria for 3101 decision		ļ	1		
13 T(1	1		
13 T(Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
13 TO		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties					
13 TC		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151 217 167				
13 TC		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	217 167 168				
13 TC		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft	217 167				
13 TC		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.	217 167 168 198				
13 TC		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft	217 167 168				
13 TC		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting	217 167 168 198 201				
		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration	217 167 168 198 201				
	D05B42	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting	217 167 168 198 201		13; 22;	38; 41;	50; 51; 54; 55; 58; 60; 61; 62; 63
	D05B42	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration	217 167 168 198 201		13; 22;	38; 41;	50; 51; 54; 55; 58; 60; 61; 62; 63



		precursors ar	iu 3r	15			safety certifi	
Cod	da	Identifiable precursors	No	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations	
Cou	ue	Pilot tiredness - Inadequate workload distribution	167	3FIS. Technology	SFIS. Hullian	3FIS. Organisation	Organisations	
		Flaws in pilot requirements definition process and/or training methodology	168					
		Lack of adherence to SOP for take-off procedure in terms of determining of aircraft	198					
		configuration.						
		Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201					
		Incorrect stab-trim setting	258					
		Undetected incorrect takeoff configuration	259					
15 TO0	05B51	Adverse weather in terms of heavy rain or icing conditions resulted with decreased	45		13; 22;	38; 41;	48; 50; 51; 54; 55; 58	
		RWY surface friction rate					59; 60; 61; 62; 63	
		Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168					
		Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft	200					
		handling						
		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY	203					
		surface condition. Snow / ice presence / or runway surface friction rate below						
		minimum High energy RTO rate is an indicator of improper Operator's policy for T/O operations.	211					
		High energy KTO rate is an indicator of improper Operator's policy for 170 operations.	211					
		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment	179					
		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151					
-		or / and passive contribution to the PF duties	20-					
		Unintuitive and / or error prone system manual - FMC	217 167		+		1	
		Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167				1	
		Lack of adherence to SOP for take-off procedure in terms of determining of aircraft	198					
		configuration.						
		Lack of adherence to SOP for take-off procedure in terms of checking take-off	201					
-		configuration before application of take-off power. Incorrect stab-trim setting	258		+		+	
		Undetected incorrect takeoff configuration	258					
		Cautions / warnings (genuine or spurious) that may lead to a low-speed or high-speed	46					
		rejected take-off						
		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151					
		or / and passive contribution to the PF duties						
_		Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168					
		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207					
		, , , , , , , , , , , , , , , , , , , ,						
16 TO0	05B52	System failure affecting aircraft configuration, controllability and/or flying qualities	25	7; 9;	13; 22;	38; 41;	50; 51; 54; 55; 58; 59	
							60; 61; 62; 63	
		Pilot tiredness - Inadequate workload distribution	167 168					
		Flaws in pilot requirements definition process and/or training methodology Flaws in aircraft system maintenance process definition - Braking system related	268					
		components	200					
		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151					
		or / and passive contribution to the PF duties						
		Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution	217 167					
		Flaws in pilot requirements definition process and/or training methodology	168					
		Lack of adherence to SOP for take-off procedure in terms of determining of aircraft	198					
		configuration.						
		Lack of adherence to SOP for take-off procedure in terms of checking take-off	201					
		configuration before application of take-off power.	250					
		Incorrect stab-trim setting Undetected incorrect takeoff configuration	258 259					
		Cautions / warnings (genuine or spurious) that may lead to a low-speed or high-speed	46					
		rejected take-off	L					
		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151					
-		or / and passive contribution to the PF duties	4.6=				1	
-		Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168					
		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207					
		, and the second	Ľ	<u> </u>				
17 TO0	05B53	Pilot tiredness - Inadequate workload distribution	167		13; 22;	28; 29; 30; 38; 41;	50; 51; 54; 55; 58; 59	
							60; 61; 62; 63	
-		Flaws in pilot requirements definition process and/or training methodology	168					
		Poor application of T/O & RTO procedure, braking initiation sequence Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	199 151					
		or / and passive contribution to the PF duties	101					
		Unintuitive and / or error prone system manual - FMC	217					
		Pilot tiredness - Inadequate workload distribution	167					
		Flaws in pilot requirements definition process and/or training methodology	168					
		Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.	198					
_		Lack of adherence to SOP for take-off procedure in terms of checking take-off	201					
		configuration before application of take-off power.						
		Incorrect stab-trim setting	258					
		Undetected incorrect takeoff configuration	259					
		Cautions / warnings (genuine or spurious) that may lead to a low-speed or high-speed	46					
		rejected take-off Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151	-				
		or / and passive contribution to the PF duties	101					
_		Pilot tiredness - Inadequate workload distribution	167					
- 1								



						SPIs: System of
Code	Identifiable precursors	NO. 207	SPIs: Technology	SPIs: Human	SPIs: Organisation	Organisations
TO05B61	not identifiable at that level		2; 3;	13; 22;	38; 41;	50; 51; 54; 55; 58; 5
	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				60; 61; 62; 63
	or / and passive contribution to the PF duties	151				
	Unintuitive and / or error prone system manual - FMC	217				
	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168				
	Lack of adherence to SOP for take-off procedure in terms of determining of aircraft	198				
	configuration.					
	Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201				
	Incorrect stab-trim setting	258				
	Undetected incorrect takeoff configuration	259				
	System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby	25 26				
	instruments	20				
	Flaws in maintenance technician / airworthiness specialist requirements definition	149				
	process and/or training methodology	150				
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150				
	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
	or / and passive contribution to the PF duties	107				
+	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168	+	+	+	+
1	Incorrect use of automation - TOCW System	192	<u> </u>			
	Flaws in aircraft system maintenance process definition - TOCW System	204				
	Unintuitive and / or error prone system manual - TOCW	219 229				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System	229				
	Inadequate certification process and / or flaws in methodology concerning verification	230				
	of the system / product compliance with requirements - Power supply system					
+	components Flaws in manufacturer quality control process - Power supply system components	238				+
	Flaws in aircraft system maintenance process definition - Electrical wiring System	252				
19 TO05B622	Lack of adherence to SOP in terms of awareness on supporting systems warning -	197	2; 3;	13; 22;	38; 41;	50; 51; 54; 55; 58;
	stickshaker Pilot tiredness - Inadequate workload distribution	167				60; 61; 62; 63
	Flaws in pilot requirements definition process and/or training methodology	168				+
	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
	or / and passive contribution to the PF duties					
+	Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution	217 167				+
	Flaws in pilot requirements definition process and/or training methodology	168				
	Lack of adherence to SOP for take-off procedure in terms of determining of aircraft	198				
	configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off	201				+
	configuration before application of take-off power.	201				
	Incorrect stab-trim setting	258				
	Undetected incorrect takeoff configuration	259				
+	System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby	25 26				+
	instruments					
	Flaws in maintenance technician / airworthiness specialist requirements definition	149				
	process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
	distribution	130				
	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
1	or / and passive contribution to the PF duties	4.5-	ļ			1
	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168				
1	Incorrect use of automation - TOCW System	192	<u> </u>			
	Flaws in aircraft system maintenance process definition - TOCW System	204				
	Unintuitive and / or error prone system manual - TOCW	219				_
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System	229				
	Inadequate certification process and / or flaws in methodology concerning verification	230				
	of the system / product compliance with requirements - Power supply system					
	components Flaws in manufacturer quality control process - Power supply system components	238				+
1	Flaws in maintracturer quality control process - Power supply system components Flaws in aircraft system maintenance process definition - Electrical wiring System	252	<u> </u>			1
20 TO05B6211	System failure affecting the operation of primary instruments / displays or standby	26	2; 3;	13; 22;	38; 41;	50; 51; 54; 55; 58;
+	instruments	120	-			60; 61; 62; 63
+	Flaws in aircraft system maintenance process definition - stickshaker Flaws in maintenance technician / airworthiness specialist requirements definition	136 149	 		+	
	process and/or training methodology	Ĺ	<u> </u>			<u> </u>
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
+	distribution Inadequate certification process and / or flaws in methodology concerning verification	161	-	+		+
	of the system / product compliance with requirements - stickshaker system	101				
	components	$oxed{oxed}$				
	Flaws in manufacturer quality control process - Stickshaker system components	266				
	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151		1		



	precursors and SPIs							
						SPIs: System of		
Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	Organisations		
	Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution	167						
	Flaws in pilot requirements definition process and/or training methodology	168						
	Lack of adherence to SOP for take-off procedure in terms of determining of aircraft	198						
	configuration.	201						
	Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201						
	Incorrect stab-trim setting	258						
	Undetected incorrect takeoff configuration	259						
	System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby instruments	25 26						
	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149						
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150						
	distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151						
	Pilot tiredness - Inadequate workload distribution	167						
	Flaws in pilot requirements definition process and/or training methodology	168						
	Incorrect use of automation - TOCW System	192						
	Flaws in aircraft system maintenance process definition - TOCW System Unintuitive and / or error prone system manual - TOCW	204 219	+	+		+		
	Inadequate certification process and / or flaws in methodology concerning verification	229						
	of the system / product compliance with requirements - TOCW System							
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components	230						
	Flaws in manufacturer quality control process - Power supply system components	238						
	Flaws in aircraft system maintenance process definition - Electrical wiring System	252						
21 TO05B6212	Contaminated wing	12	2; 3; 6;	13; 22;	38; 41;	48; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63		
	Extreme icing conditions encounter	20						
	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151						
	Unintuitive and / or error prone system manual - FMC	217						
	Pilot tiredness - Inadequate workload distribution	167						
	Flaws in pilot requirements definition process and/or training methodology	168						
	Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.	198						
	Lack of adherence to SOP for take-off procedure in terms of checking take-off	201						
	configuration before application of take-off power.							
	Incorrect stab-trim setting	258						
	Undetected incorrect takeoff configuration System failure affecting aircraft configuration, controllability and/or flying qualities	259 25						
	System failure affecting the operation of primary instruments / displays or standby instruments	26						
	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149						
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150						
	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151						
	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168	+	+		+		
	Incorrect use of automation - TOCW System	192						
	Flaws in aircraft system maintenance process definition - TOCW System	204						
	Unintuitive and / or error prone system manual - TOCW	219	-	+		+		
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System	229						
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components	230						
	Flaws in manufacturer quality control process - Power supply system components	238						
22 700	Flaws in aircraft system maintenance process definition - Electrical wiring System	252		42.20	20.41	40, 50, 54, 51, 55		
22 TO05B71	not identifiable at the moment Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151	2; 3; 6;	13; 22;	38; 41;	48; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63		
	or / and passive contribution to the PF duties		<u> </u>					
	Unintuitive and / or error prone system manual - FMC	217						
	Pilot tiredness - Inadequate workload distribution	167	1	1				
	Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.	168 198						
	Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201						
	Incorrect stab-trim setting	258						
	Undetected incorrect takeoff configuration	259						
	System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby	25 26		+				
	instruments	20	<u> </u>					
	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149						
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150	+	+		+		
	iviaintenance technician / airworthiness specialist tirenness - manennare workinan							



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Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
	or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution	167				_
	Flaws in pilot requirements definition process and/or training methodology	168				
	Incorrect use of automation - TOCW System	192				
	Flaws in aircraft system maintenance process definition - TOCW System	204				
	Unintuitive and / or error prone system manual - TOCW	219				
	Inadequate certification process and / or flaws in methodology concerning verification	229				
+	of the system / product compliance with requirements - TOCW System Inadequate certification process and / or flaws in methodology concerning verification	230				
	of the system / product compliance with requirements - Power supply system	230				
	components					
	Flaws in manufacturer quality control process - Power supply system components	238				
	Flaws in aircraft system maintenance process definition - Electrical wiring System	252				
	Contaminated wing	12				
+	Extreme icing conditions encounter	20				
	System failure affecting the operation of primary instruments / displays or standby instruments	26				
_	Flaws in aircraft system maintenance process definition - stickshaker	136				
1	Flaws in maintenance technician / airworthiness specialist requirements definition	149		1		
	process and/or training methodology	\perp				
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
+	distribution					1
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - stickshaker system	161		1		
1	of the system / product compliance with requirements - stickshaker system components		1	1		1
1	Pilot tiredness - Inadequate workload distribution	167		1		1
<u> </u>	Flaws in pilot requirements definition process and/or training methodology	168				
	Inadequate aircraft de-icing / anti-icing	180				
_	Lack of adherence to SOP in terms of awareness on supporting systems warning -	197		_		
+	stickshaker Pear application of T/O procedure, use of MET / ATIS information, aircraft do ising	208		+		+
+	Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.	210				
+	Lack of adherence to SOP in terms of options and Holdover time (HOT)	212				
	Applied de-icing / anti-icing method is not sufficient for predicted conditions	228				
	Lack of adherence to SOP in terms of aircraft icing (condition) monitoring	231				
	Lack of adherence to SOP in terms of de-icing / anti-icing procedures.	232				
3 TO05B72	Pilot tiredness - Inadequate workload distribution	167	2; 3; 6;	13; 22;	38; 41;	48; 50; 51; 54; 55;
+		460				59; 60; 61; 62; 63
+	Flaws in pilot requirements definition process and/or training methodology Lack of adherence to AFM in terms of emergency procedures - stall recovery	168 292				+
+	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				+
	or / and passive contribution to the PF duties	131				
	Unintuitive and / or error prone system manual - FMC	217				
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168				
	Lack of adherence to SOP for take-off procedure in terms of determining of aircraft	198				
+	configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off	201				+
	configuration before application of take-off power.	201				
	Incorrect stab-trim setting	258				
	Undetected incorrect takeoff configuration	259				
	System failure affecting aircraft configuration, controllability and/or flying qualities	25				
	System failure affecting the operation of primary instruments / displays or standby	26				
+	instruments Flaws in maintenance technician / airworthiness specialist requirements definition	149		+		
1	process and/or training methodology	149	1	1		1
1	Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150		1		
	distribution					
	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
+	or / and passive contribution to the PF duties	4.55		+		+
	Pilot tiredness - Inadequate workload distribution	167 168		+		
						+
	Flaws in pilot requirements definition process and/or training methodology					
		192 204				
	Flaws in pilot requirements definition process and/or training methodology Incorrect use of automation - TOCW System	192				
	Flaws in pilot requirements definition process and/or training methodology Incorrect use of automation - TOCW System Flaws in aircraft system maintenance process definition - TOCW System Unintuitive and / or error prone system manual - TOCW Inadequate certification process and / or flaws in methodology concerning verification	192 204				
	Flaws in pilot requirements definition process and/or training methodology Incorrect use of automation - TOCW System Flaws in aircraft system maintenance process definition - TOCW System Unintuitive and / or error prone system manual - TOCW Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System	192 204 219 229				
	Flaws in pilot requirements definition process and/or training methodology Incorrect use of automation - TOCW System Flaws in aircraft system maintenance process definition - TOCW System Unintuitive and / or error prone system manual - TOCW Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System Inadequate certification process and / or flaws in methodology concerning verification	192 204 219				
	Flaws in pilot requirements definition process and/or training methodology Incorrect use of automation - TOCW System Flaws in aircraft system maintenance process definition - TOCW System Unintuitive and / or error prone system manual - TOCW Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system	192 204 219 229				
	Flaws in pilot requirements definition process and/or training methodology Incorrect use of automation - TOCW System Flaws in aircraft system maintenance process definition - TOCW System Unintuitive and / or error prone system manual - TOCW Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components	192 204 219 229				
	Flaws in pilot requirements definition process and/or training methodology Incorrect use of automation - TOCW System Flaws in aircraft system maintenance process definition - TOCW System Unintuitive and / or error prone system manual - TOCW Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system	192 204 219 229 230				
	Flaws in pilot requirements definition process and/or training methodology Incorrect use of automation - TOCW System Flaws in aircraft system maintenance process definition - TOCW System Unintuitive and / or error prone system manual - TOCW Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components Flaws in manufacturer quality control process - Power supply system components	192 204 219 229 230				
	Flaws in pilot requirements definition process and/or training methodology Incorrect use of automation - TOCW System Flaws in aircraft system maintenance process definition - TOCW System Unintuitive and / or error prone system manual - TOCW Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components Flaws in manufacturer quality control process - Power supply system components Flaws in aircraft system maintenance process definition - Electrical wiring System Contaminated wing Extreme icing conditions encounter	204 219 229 230 238 252 12 20				
	Flaws in pilot requirements definition process and/or training methodology Incorrect use of automation - TOCW System Flaws in aircraft system maintenance process definition - TOCW System Unintuitive and / or error prone system manual - TOCW Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components Flaws in aircraft system maintenance process - Power supply system components Flaws in aircraft system maintenance process definition - Electrical wiring System Contaminated wing Extreme icing conditions encounter System failure affecting the operation of primary instruments / displays or standby	192 204 219 229 230 238 252 12				
	Flaws in pilot requirements definition process and/or training methodology Incorrect use of automation - TOCW System Flaws in aircraft system maintenance process definition - TOCW System Unintuitive and / or error prone system manual - TOCW Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components Flaws in manufacturer quality control process - Power supply system components Flaws in aircraft system maintenance process definition - Electrical wiring System Contaminated wing Extreme icing conditions encounter System failure affecting the operation of primary instruments / displays or standby instruments	204 219 229 230 238 252 12 20 26				
	Flaws in pilot requirements definition process and/or training methodology Incorrect use of automation - TOCW System Flaws in aircraft system maintenance process definition - TOCW System Unintuitive and / or error prone system manual - TOCW Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components Flaws in manufacturer quality control process - Power supply system components Flaws in aircraft system maintenance process definition - Electrical wiring System Contaminated wing Extreme icing conditions encounter System failure affecting the operation of primary instruments / displays or standby instruments Flaws in aircraft system maintenance process definition - stickshaker	204 219 229 230 238 252 12 20 26				
	Flaws in pilot requirements definition process and/or training methodology Incorrect use of automation - TOCW System Flaws in aircraft system maintenance process definition - TOCW System Unintuitive and / or error prone system manual - TOCW Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components Flaws in manufacturer quality control process - Power supply system components Flaws in aircraft system maintenance process definition - Electrical wiring System Contaminated wing Extreme icing conditions encounter System failure affecting the operation of primary instruments / displays or standby instruments Flaws in aircraft system maintenance process definition - stickshaker Flaws in mircraft system maintenance process definition - stickshaker Flaws in maintenance technician / airworthiness specialist requirements definition	204 219 229 230 238 252 12 20 26				
	Flaws in pilot requirements definition process and/or training methodology Incorrect use of automation - TOCW System Flaws in aircraft system maintenance process definition - TOCW System Unintuitive and / or error prone system manual - TOCW Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components Flaws in manufacturer quality control process - Power supply system components Flaws in aircraft system maintenance process definition - Electrical wiring System Contaminated wing Extreme icing conditions encounter System failure affecting the operation of primary instruments / displays or standby instruments Flaws in aircraft system maintenance process definition - stickshaker Flaws in amintenance technician / airworthiness specialist requirements definition process and/or training methodology	204 219 229 230 238 252 12 20 26				
	Flaws in pilot requirements definition process and/or training methodology Incorrect use of automation - TOCW System Flaws in aircraft system maintenance process definition - TOCW System Unintuitive and / or error prone system manual - TOCW Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components Flaws in manufacturer quality control process - Power supply system components Flaws in aircraft system maintenance process definition - Electrical wiring System Contaminated wing Extreme icing conditions encounter System failure affecting the operation of primary instruments / displays or standby instruments Flaws in aircraft system maintenance process definition - stickshaker Flaws in mircraft system maintenance process definition - stickshaker Flaws in maintenance technician / airworthiness specialist requirements definition	192 204 219 229 230 238 252 12 20 26 136 149				
	Flaws in pilot requirements definition process and/or training methodology Incorrect use of automation - TOCW System Flaws in aircraft system maintenance process definition - TOCW System Unintuitive and / or error prone system manual - TOCW Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components Flaws in manufacturer quality control process - Power supply system components Flaws in aircraft system maintenance process definition - Electrical wiring System Contaminated wing Extreme icing conditions encounter System failure affecting the operation of primary instruments / displays or standby instruments Flaws in aircraft system maintenance process definition - stickshaker Flaws in aircraft system maintenance process definition - stickshaker Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	192 204 219 229 230 238 252 12 20 26 136 149				



		precursors ar	10 51				Surety corune
			l				SPIs: System of
	Code	Identifiable precursors Pilot tiredness - Inadequate workload distribution	NO. 167	SPIs: Technology	SPIs: Human	SPIs: Organisation	Organisations
		Flaws in pilot requirements definition process and/or training methodology	168				
		Inadequate aircraft de-icing / anti-icing	180				
		Lack of adherence to SOP in terms of awareness on supporting systems warning -	197				
		stickshaker	-				
		Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing	208	+			+
		Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure. Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT)	210 212				+
		Applied de-icing / anti-icing method is not sufficient for predicted conditions	228				
		Lack of adherence to SOP in terms of aircraft icing (condition) monitoring	231				
		Lack of adherence to SOP in terms of de-icing / anti-icing procedures.	232				
24	TO05B73	Flaws in pilot requirements definition process and/or training methodology	168	2; 3; 6;	13; 22;	38; 41;	48; 50; 51; 54; 55; 58;
		Pilot tiredness - Inadequate workload distribution	167		+		59; 60; 61; 62; 63
		Lack of adherence to AFM in terms of emergency procedures - stall recovery	292				_
		Inadequate stall recovery procedure for the aircraft	152				
		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
		or / and passive contribution to the PF duties					
		Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution	217 167				+
		Flaws in pilot requirements definition process and/or training methodology	168		+		+
	1	Lack of adherence to SOP for take-off procedure in terms of determining of aircraft	198	<u> </u>			+
		configuration.					
		Lack of adherence to SOP for take-off procedure in terms of checking take-off	201				
	+	configuration before application of take-off power.	350				+
	1	Incorrect stab-trim setting Undetected incorrect takeoff configuration	258 259	+	+		+
		System failure affecting aircraft configuration, controllability and/or flying qualities	25	1			+
		System failure affecting the operation of primary instruments / displays or standby	26				
		instruments	\perp				
		Flaws in maintenance technician / airworthiness specialist requirements definition	149				
		process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150		_		_
		distribution	130				
		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
		or / and passive contribution to the PF duties					
		Pilot tiredness - Inadequate workload distribution	167				
		Flaws in pilot requirements definition process and/or training methodology	168				
		Incorrect use of automation - TOCW System Flaws in aircraft system maintenance process definition - TOCW System	192 204				+
		Unintuitive and / or error prone system manual - TOCW	219		+		+
		Inadequate certification process and / or flaws in methodology concerning verification	229				+
		of the system / product compliance with requirements - TOCW System	\perp				
		Inadequate certification process and / or flaws in methodology concerning verification	230				
		of the system / product compliance with requirements - Power supply system components					
		Flaws in manufacturer quality control process - Power supply system components	238				+
		Flaws in aircraft system maintenance process definition - Electrical wiring System	252				
		Contaminated wing	12				
		Extreme icing conditions encounter	20				
		System failure affecting the operation of primary instruments / displays or standby	26				
		instruments Flaws in aircraft system maintenance process definition - stickshaker	136		_		_
		Flaws in maintenance technician / airworthiness specialist requirements definition	149		+		+
		process and/or training methodology	1.5				
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
		distribution	╄				
		Inadequate certification process and / or flaws in methodology concerning verification	161				
		of the system / product compliance with requirements - stickshaker system components	1				
	1	Pilot tiredness - Inadequate workload distribution	167	 			+
		Flaws in pilot requirements definition process and/or training methodology	168				
		Inadequate aircraft de-icing / anti-icing	180				
		Lack of adherence to SOP in terms of awareness on supporting systems warning -	197				
		stickshaker	200		1		+
	-	Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.	208 210	+			+
	+	Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure. Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT)	210				+
		Applied de-icing / anti-icing method is not sufficient for predicted conditions	228	+			+
		Lack of adherence to SOP in terms of aircraft icing (condition) monitoring	231				
		Lack of adherence to SOP in terms of de-icing / anti-icing procedures.	232				
25	TO05B74	Flaws in pilot requirements definition process and/or training methodology	168	2; 3; 6;	13; 22;	38; 41;	48; 50; 51; 54; 55; 58;
	-	Pilot tiredness - Inadequate workload distribution	167	+			59; 60; 61; 62; 63
	+	Lack of adherence to AFM in terms of emergency procedures - stall recovery	292	 			+
	1	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				1
	<u> </u>	or / and passive contribution to the PF duties	1		<u> </u>		<u> </u>
		Unintuitive and / or error prone system manual - FMC	217				
	ļ	Pilot tiredness - Inadequate workload distribution	167				
	ļ	Flaws in pilot requirements definition process and/or training methodology	168				
		Lack of adherence to SOP for take-off procedure in terms of determining of aircraft	198				
	T. Control of the Con	configuration.	1204	+	+		+
		Lack of adherence to SOP for take-off procedure in terms of checking take-off					
		Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201				



		precursors ar	iu sr	15			safety certifi
							SPIs: System of
	Code	Identifiable precursors	No. 259	SPIs: Technology	SPIs: Human	SPIs: Organisation	Organisations
		System failure affecting aircraft configuration, controllability and/or flying qualities	25				
		System failure affecting the operation of primary instruments / displays or standby	26				
		instruments Flaws in maintenance technician / airworthiness specialist requirements definition	149				
		process and/or training methodology	143				
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
		distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
		or / and passive contribution to the PF duties					
		Pilot tiredness - Inadequate workload distribution	167				
	+	Flaws in pilot requirements definition process and/or training methodology Incorrect use of automation - TOCW System	168 192				
		Flaws in aircraft system maintenance process definition - TOCW System	204				
	-	Unintuitive and / or error prone system manual - TOCW	219 229				
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System	229				
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system	230				
		components					
		Flaws in manufacturer quality control process - Power supply system components Flaws in aircraft system maintenance process definition - Electrical wiring System	238 252		+		
		Contaminated wing	12		+		
		Extreme icing conditions encounter	20				
		System failure affecting the operation of primary instruments / displays or standby instruments	26				
		Flaws in aircraft system maintenance process definition - stickshaker	136		+		
		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149				
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150				
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - stickshaker system	161				
	-	components Pilot tiredness - Inadequate workload distribution	167				
		Flaws in pilot requirements definition process and/or training methodology	168				
		Inadequate aircraft de-icing / anti-icing	180				
		Lack of adherence to SOP in terms of awareness on supporting systems warning - stickshaker	197				
	+	Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.	208				
		Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT)	212				
		Applied de-icing / anti-icing method is not sufficient for predicted conditions	228				
		Lack of adherence to SOP in terms of aircraft icing (condition) monitoring Lack of adherence to SOP in terms of de-icing / anti-icing procedures.	231				
ESD 6	6 Code	Identifiable Precursors	No.	Technology	Human	Organisation	System of Organisations
	1	Pre-Service De-icing Failure					
-	1 TO06B11	Extreme icing conditions encounter	20		13;	41;	48; 50; 51; 54; 55; 59 60; 61; 62; 63
		Convective weather encounter	18				00,00,00
-	2 TO06B121	Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing	208		13;	41;	48; 50; 51; 54; 55; 59
		Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.	210				60; 61; 62; 63
3	3 TO06B1221	Inadequate aircraft de-icing / anti-icing	180		13;	41;	48; 50; 51; 54; 55; 59
		Applied de-icing / anti-icing method is not sufficient for predicted conditions	228				60; 61; 62; 63
-	4 TO06B1222	Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	129		13;	41;	48; 50; 51; 54; 55; 59
		distribution					60; 61; 62; 63
		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130				
		Inadequate aircraft de-icing / anti-icing	180				
		Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.	210				
	TO06B211	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151		13;	41;	48; 50; 51; 54; 55; 59 60; 61; 62; 63
		Pilot tiredness - Inadequate workload distribution	167				00, 01, 02, 03
		Flaws in pilot requirements definition process and/or training methodology	168				
		Lack of adherence to SOP in terms of pre-flight inspections - ice presence on aircraft Convective weather encounter	309 18	_	 		
		Extreme icing conditions encounter	20		+		
		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129				
		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130				
		process and/or training methodology	180				
		Inadequate aircraft de-icing / anti-icing		1			
		Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing	208				
		Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.	210				
	6 TO06B212	Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing	-		13;	41;	48; 50; 51; 54; 55; 5
(5 TO06B212	Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure. Applied de-icing / anti-icing method is not sufficient for predicted conditions Pilot tiredness - Inadequate workload distribution	210 228 167		13;	41;	48; 50; 51; 54; 55; 59 60; 61; 62; 63
(5 TO06B212	Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure. Applied de-icing / anti-icing method is not sufficient for predicted conditions Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	210 228 167 168		13;	41;	48; 50; 51; 54; 55; 5! 60; 61; 62; 63
(5 TO06B212	Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure. Applied de-icing / anti-icing method is not sufficient for predicted conditions Pilot tiredness - Inadequate workload distribution	210 228 167		13;	41;	



1	precursors ar	т-	I	1		
						SPIs: System of
Code	Identifiable precursors	No. 129	SPIs: Technology	SPIs: Human	SPIs: Organisation	Organisations
	distribution	123				
	Flaws in vehicle driver / equipment operator / ground agent requirements definition	130				
	process and/or training methodology Inadequate aircraft de-icing / anti-icing	180		_		+
	Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing	208				
	Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.	210				
7 TO06B22	Applied de-icing / anti-icing method is not sufficient for predicted conditions	228		42	41;	48; 50; 51; 54; 55; 5
71006822	Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129		13;	41;	60; 61; 62; 63
	Flaws in vehicle driver / equipment operator / ground agent requirements definition	130				,.,.,.
	process and/or training methodology	210				
	Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure. Convective weather encounter	210 18				+
	Extreme icing conditions encounter	20				
	Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	129				
	distribution	130				
	Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130				
	Inadequate aircraft de-icing / anti-icing	180				
	Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing	208				
	Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure. Applied de-icing / anti-icing method is not sufficient for predicted conditions	210 228				
8 TO06B231	Extreme icing condition and / or heavy snow. Break in airport operation due to adverse	_		13;	41;	48; 50; 51; 54; 55;
	weather or / and necessity of RWY surface maintenance.					60; 61; 62; 63
	Convective weather encounter	18 20				1
	Extreme icing conditions encounter Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	129		+		+
	distribution					
	Flaws in vehicle driver / equipment operator / ground agent requirements definition	130				
	process and/or training methodology Inadequate aircraft de-icing / anti-icing	180				+
	Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing	208				
	Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.	210				
9 TO06B232	Applied de-icing / anti-icing method is not sufficient for predicted conditions	228 11		12.	41.	48; 50; 51; 54; 55;
910068232	inadequate anti-ice fluid holdover Time (HOT)	11		13;	41;	60; 61; 62; 63
	Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT)	212				00,00,00
	Inadequate certification process and / or flaws in methodology concerning verification	213				
	of the system / product compliance with requirements - antiice fluid HOT					
	Flaws in manufacturer quality control process - anti-ice fluid specifications (HOT)	310				
	Convective weather encounter	18				
	Extreme icing conditions encounter Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	20 129				
	distribution	129				
	Flaws in vehicle driver / equipment operator / ground agent requirements definition	130				
	process and/or training methodology					
	Inadequate aircraft de-icing / anti-icing Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing	180 208		_		+
	Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.	210				+
	Applied de-icing / anti-icing method is not sufficient for predicted conditions	228				
10 TO06B233	Convective weather encounter	18		13;	41;	48; 50; 51; 54; 55;
	Extreme icing conditions encounter	20		+		60; 61; 62; 63
	Convective weather encounter	18				
	Extreme icing conditions encounter	20				
	Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129				1
	Flaws in vehicle driver / equipment operator / ground agent requirements definition	130		+		+
	process and/or training methodology					
	Inadequate aircraft de-icing / anti-icing	180				
	Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.	208		+		+
	Applied de-icing / anti-icing method is not sufficient for predicted conditions	228		+		1
11 TO06B311	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151		13;	41;	48; 50; 51; 54; 55;
	or / and passive contribution to the PF duties	107		+		60; 61; 62; 63
	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168		+		+
	Lack of adherence to TO procedure in terms of antiice protection	297				
	Convective weather encounter	18				
	Extreme icing conditions encounter Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	20 129		+		1
	distribution	129				
	Flaws in vehicle driver / equipment operator / ground agent requirements definition	130		1		
	process and/or training methodology					
	Inadequate aircraft de-icing / anti-icing Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing	180 208		+		+
	Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.	210		+		+
	Applied de-icing / anti-icing method is not sufficient for predicted conditions	228				
	inadequate anti-ice fluid holdover Time (HOT)	11				
	Convective weather encounter Extreme icing conditions encounter	18 20		+		+
	Extreme icing conditions encounter Extreme icing condition and / or heavy snow. Break in airport operation due to adverse			+		1
	weather or / and necessity of RWY surface maintenance.	1	1			



	precursors ar	14 51	15	1		safety cer
						SPIs: System of
Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	Organisations
	Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	129				
+	distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition	130				
	process and/or training methodology	130				
	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
	or / and passive contribution to the PF duties					
+	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168		+		
	Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.	210				
	Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT)	212				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - antiice fluid HOT	213				
	of the system / product compliance with requirements - antifice hald not					
	Lack of adherence to SOP in terms of pre-flight inspections - ice presence on aircraft	309				
12 TOOCD242	Flaws in manufacturer quality control process - anti-ice fluid specifications (HOT)	310		43	44	40, 50, 51, 54, 55,
12 TO06B312	Adverse weather / poor visibility conditions / darkness	6		13;	41;	48; 50; 51; 54; 55; 60; 61; 62; 63
+	Convective weather encounter	18				00, 01, 02, 03
	Extreme icing conditions encounter	20				
	Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	129				
+	distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition	130			+	
	process and/or training methodology	Ĺ				
	Inadequate aircraft de-icing / anti-icing	180				<u> </u>
+	Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.	208		+	+	
+	Applied de-icing / anti-icing method is not sufficient for predicted conditions	228				
	inadequate anti-ice fluid holdover Time (HOT)	11				
+	Convective weather encounter	18				
+	Extreme icing conditions encounter Extreme icing condition and / or heavy snow. Break in airport operation due to adverse	20 31				
	weather or / and necessity of RWY surface maintenance.	31				
	Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	129				
+	distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition	130				
	process and/or training methodology	130				
	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
	or / and passive contribution to the PF duties					
+	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168				
+	Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.	210				
	Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT)	212				
	Inadequate certification process and / or flaws in methodology concerning verification	213				
	of the system / product compliance with requirements - antiice fluid HOT					
	Lack of adherence to SOP in terms of pre-flight inspections - ice presence on aircraft	309				
	Flaws in manufacturer quality control process - anti-ice fluid specifications (HOT)	310				
13 TO06B32	Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129		13;	41;	48; 50; 51; 54; 55; 60; 61; 62; 63
+	Flaws in vehicle driver / equipment operator / ground agent requirements definition	130		+		00, 01, 02, 03
	process and/or training methodology					
+	Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.	210				
+	Convective weather encounter Extreme icing conditions encounter	18 20				
	Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	129				
	distribution					
		4.5	 	_		
	Flaws in vehicle driver / equipment operator / ground agent requirements definition	130				
		130 180				
	Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Inadequate aircraft de-icing / anti-icing Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing	180 208				
	Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Inadequate aircraft de-icing / anti-icing Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.	180 208 210				
	Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Inadequate aircraft de-icing / anti-icing Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure. Applied de-icing / anti-icing method is not sufficient for predicted conditions	180 208				
	Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Inadequate aircraft de-icing / anti-icing Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.	180 208 210 228				
	Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Inadequate aircraft de-icing / anti-icing Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure. Applied de-icing / anti-icing method is not sufficient for predicted conditions inadequate anti-ice fluid holdover Time (HOT) Convective weather encounter Extreme icing conditions encounter	180 208 210 228 11 18 20				
	Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Inadequate aircraft de-icing / anti-icing Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure. Applied de-icing / anti-icing method is not sufficient for predicted conditions inadequate anti-ice fluid holdover Time (HOT) Convective weather encounter Extreme icing conditions encounter Extreme icing conditions and / or heavy snow. Break in airport operation due to adverse	180 208 210 228 11 18 20				
	Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Inadequate aircraft de-icing / anti-icing Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure. Applied de-icing / anti-icing method is not sufficient for predicted conditions inadequate anti-ice fluid holdover Time (HOT) Convective weather encounter Extreme icing conditions encounter Extreme icing condition and / or heavy snow. Break in airport operation due to adverse weather or / and necessity of RWY surface maintenance.	180 208 210 228 11 18 20 31				
	Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Inadequate aircraft de-icing / anti-icing Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure. Applied de-icing / anti-icing method is not sufficient for predicted conditions inadequate anti-ice fluid holdover Time (HOT) Convective weather encounter Extreme icing conditions encounter Extreme icing conditions and / or heavy snow. Break in airport operation due to adverse	180 208 210 228 11 18 20				
	Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Inadequate aircraft de-icing / anti-icing Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure. Applied de-icing / anti-icing method is not sufficient for predicted conditions inadequate anti-ice fluid holdover Time (HOT) Convective weather encounter Extreme icing conditions encounter Extreme icing conditions encounter Extreme icing condition and / or heavy snow. Break in airport operation due to adverse weather or / and necessity of RWY surface maintenance. Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition	180 208 210 228 11 18 20 31				
	Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Inadequate aircraft de-icing / anti-icing Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure. Applied de-icing / anti-icing method is not sufficient for predicted conditions inadequate anti-ice fluid holdover Time (HOT) Convective weather encounter Extreme icing conditions encounter Extreme icing conditions and / or heavy snow. Break in airport operation due to adverse weather or / and necessity of RWY surface maintenance. Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	180 208 210 228 11 18 20 31 129				
	Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Inadequate aircraft de-icing / anti-icing Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure. Applied de-icing / anti-icing method is not sufficient for predicted conditions inadequate anti-ice fluid holdover Time (HOT) Convective weather encounter Extreme icing conditions encounter Extreme icing conditions encounter Extreme icing condition and / or heavy snow. Break in airport operation due to adverse weather or / and necessity of RWY surface maintenance. Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition	180 208 210 228 11 18 20 31				
	Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Inadequate aircraft de-icing / anti-icing Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure. Applied de-icing / anti-icing method is not sufficient for predicted conditions inadequate anti-ice fluid holdover Time (HOT) Convective weather encounter Extreme icing conditions encounter Extreme icing conditions and / or heavy snow. Break in airport operation due to adverse weather or / and necessity of RWY surface maintenance. Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	180 208 210 228 11 18 20 31 129				
	Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Inadequate aircraft de-icing / anti-icing Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure. Applied de-icing / anti-icing method is not sufficient for predicted conditions inadequate anti-ice fluid holdover Time (HOT) Convective weather encounter Extreme icing conditions encounter Extreme icing conditions encounter Extreme icing condition and / or heavy snow. Break in airport operation due to adverse weather or / and necessity of RWY surface maintenance. Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	180 208 210 228 11 18 20 31 129 130 151				
	Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Inadequate aircraft de-icing / anti-icing Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure. Applied de-icing / anti-icing method is not sufficient for predicted conditions inadequate anti-ice fluid holdover Time (HOT) Convective weather encounter Extreme icing conditions encounter Extreme icing conditions and / or heavy snow. Break in airport operation due to adverse weather or / and necessity of RWY surface maintenance. Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.	180 208 210 228 11 18 20 31 129 130 151 167 168 210				
	Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Inadequate aircraft de-icing / anti-icing Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure. Applied de-icing / anti-icing method is not sufficient for predicted conditions inadequate anti-ice fluid holdover Time (HOT) Convective weather encounter Extreme icing conditions encounter Extreme icing conditions and / or heavy snow. Break in airport operation due to adverse weather or / and necessity of RWY surface maintenance. Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure. Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.	180 208 210 228 11 18 20 31 129 130 151 167 168 210				
	Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Inadequate aircraft de-icing / anti-icing Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure. Applied de-icing / anti-icing method is not sufficient for predicted conditions inadequate anti-ice fluid holdover Time (HOT) Convective weather encounter Extreme icing conditions encounter Extreme icing conditions and / or heavy snow. Break in airport operation due to adverse weather or / and necessity of RWY surface maintenance. Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.	180 208 210 228 11 18 20 31 129 130 151 167 168 210				
	Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Inadequate aircraft de-icing / anti-icing Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure. Applied de-icing / anti-icing method is not sufficient for predicted conditions inadequate anti-ice fluid holdover Time (HOT) Convective weather encounter Extreme icing conditions encounter Extreme icing conditions and / or heavy snow. Break in airport operation due to adverse weather or / and necessity of RWY surface maintenance. Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure. Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT) Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - antice fluid HOT	180 208 210 228 11 18 20 31 129 130 151 167 168 210 212 213				
	Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Inadequate aircraft de-icing / anti-icing Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure. Applied de-icing / anti-icing method is not sufficient for predicted conditions inadequate anti-ice fluid holdover Time (HOT) Convective weather encounter Extreme icing conditions encounter Extreme icing conditions encounter Extreme icing condition and / or heavy snow. Break in airport operation due to adverse weather or / and necessity of RWY surface maintenance. Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of preservice) de-icing / anti-icing procedure. Lack of adherence to SOP in terms of preservice) de-icing / anti-icing procedure. Lack of adherence to SOP in terms of preservice) service fluid HOIT Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - antiice fluid HOT Lack of adherence to SOP in terms of pre-flight inspections - ice presence on aircraft	180 208 210 228 11 18 20 31 129 130 151 167 168 210 212 213				
14 TO06B331	Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Inadequate aircraft de-icing / anti-icing Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure. Applied de-icing / anti-icing method is not sufficient for predicted conditions inadequate anti-ice fluid holdover Time (HOT) Convective weather encounter Extreme icing conditions encounter Extreme icing conditions and / or heavy snow. Break in airport operation due to adverse weather or / and necessity of RWY surface maintenance. Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure. Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT) Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - antice fluid HOT	180 208 210 228 11 18 20 31 129 130 151 167 168 210 212 213		13;	41;	48; 50; 51; 54; 55;



	precursors ar	iu sr	15			safety certifi
						SPIs: System of
Code	Identifiable precursors	No. 20	SPIs: Technology	SPIs: Human	SPIs: Organisation	Organisations
	Extreme icing conditions encounter Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	129				
	distribution					
	Flaws in vehicle driver / equipment operator / ground agent requirements definition	130				
	process and/or training methodology					
	Inadequate aircraft de-icing / anti-icing Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing	180 208				
	Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.	210		+		
	Applied de-icing / anti-icing method is not sufficient for predicted conditions	228				
	inadequate anti-ice fluid holdover Time (HOT)	11				
	Convective weather encounter	18				
	Extreme icing conditions encounter	20				
	Extreme icing condition and / or heavy snow. Break in airport operation due to adverse weather or / and necessity of RWY surface maintenance.	31				
	Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	129				
	distribution					
	Flaws in vehicle driver / equipment operator / ground agent requirements definition	130				
	process and/or training methodology					
	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
	or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution	167	+	+		
	Flaws in pilot requirements definition process and/or training methodology	168	<u> </u>			
	Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.	210				
	Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT)	212				
	Inadequate certification process and / or flaws in methodology concerning verification	213				
	of the system / product compliance with requirements - antiice fluid HOT					
	Lack of adherence to SOP in terms of pre-flight inspections - ice presence on aircraft	309	+	+	+	
	Flaws in manufacturer quality control process - anti-ice fluid specifications (HOT)	310	 			
15 TO06B332	inadequate anti-ice fluid holdover Time (HOT)	11		13;	41;	48; 50; 51; 54; 55; 59
						60; 61; 62; 63
	Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT)	212				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - antiice fluid HOT	213				
	of the system / product compilance with requirements - antifice haid not					
	Flaws in manufacturer quality control process - anti-ice fluid specifications (HOT)	310				
	Convective weather encounter	18				
	Extreme icing conditions encounter	20				
	Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	129				
	distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition	130				
	process and/or training methodology	130				
	Inadequate aircraft de-icing / anti-icing	180				
	Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing	208				
	Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.	210				
	Applied de-icing / anti-icing method is not sufficient for predicted conditions	228 11				
	inadequate anti-ice fluid holdover Time (HOT) Convective weather encounter	18				
	Extreme icing conditions encounter	20				
		31				
	weather or / and necessity of RWY surface maintenance.					
	Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	129				
	distribution	120				
	Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130				
	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
	or / and passive contribution to the PF duties					
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168				1
	Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure. Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT)	210 212	+	+		
	Inadequate certification process and / or flaws in methodology concerning verification	213	+			
	of the system / product compliance with requirements - antiice fluid HOT	-13				
	<u> </u>	L				
	Lack of adherence to SOP in terms of pre-flight inspections - ice presence on aircraft	309				
46 7000000	Flaws in manufacturer quality control process - anti-ice fluid specifications (HOT)	310		42	44	40.50.54.51.55
16 TO06B333	Convective weather encounter	18		13;	41;	48; 50; 51; 54; 55; 59 60; 61; 62; 63
	Extreme icing conditions encounter	20	+	+	+	00, 01, 02, 03
	Convective weather encounter	18	<u> </u>			
	Extreme icing conditions encounter	20				
	Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	129				
	distribution	40-				
	Flaws in vehicle driver / equipment operator / ground agent requirements definition	130				
	process and/or training methodology Inadequate aircraft de-icing / anti-icing	180	+	+		+
	Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing	208	+			
	Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.	210	 			
	Applied de-icing / anti-icing method is not sufficient for predicted conditions	228				
	inadequate anti-ice fluid holdover Time (HOT)	11				
	Convective weather encounter	18				
	Extreme icing conditions encounter	20	 	1		+
	Extreme icing condition and / or heavy snow. Break in airport operation due to adverse	51	T.	- 1	1	



	precursors ar	iu 3r	15			safety cert
						SPIs: System of
Code	Identifiable precursors	-	SPIs: Technology	SPIs: Human	SPIs: Organisation	Organisations
	Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	129				
	distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition	130				
	process and/or training methodology	130				
	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
	or / and passive contribution to the PF duties					
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168				
	Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.	210				
	Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT)	212 213				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - antiice fluid HOT	213				
	of the system / product compliance with requirements - antifice fluid from					
	Lack of adherence to SOP in terms of pre-flight inspections - ice presence on aircraft	309				
	Flaws in manufacturer quality control process - anti-ice fluid specifications (HOT)	310				
17 TO06B41	not identifiable at that level			13;	41;	48; 50; 51; 54; 55; 5
						60; 61; 62; 63
	Convective weather encounter	18				
	Extreme icing conditions encounter	20				+
	Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129				
	Flaws in vehicle driver / equipment operator / ground agent requirements definition	130		+		
	process and/or training methodology					
	Inadequate aircraft de-icing / anti-icing	180				
	Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing	208				
	Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.	210				
1	Applied de-icing / anti-icing method is not sufficient for predicted conditions	228				1
1	inadequate anti-ice fluid holdover Time (HOT)	11				+
+	Convective weather encounter Extreme icing conditions encounter	18 20				+
	Extreme icing conditions encounter Extreme icing condition and / or heavy snow. Break in airport operation due to adverse	-				+
	weather or / and necessity of RWY surface maintenance.	31				
	Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	129				
	distribution					
	Flaws in vehicle driver / equipment operator / ground agent requirements definition	130				
	process and/or training methodology					
	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
_	or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution	167				+
	Flaws in pilot requirements definition process and/or training methodology	168				+
	Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.	210				
	Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT)	212				
	Inadequate certification process and / or flaws in methodology concerning verification	213				
	of the system / product compliance with requirements - antiice fluid HOT					
	Lack of adherence to SOP in terms of pre-flight inspections - ice presence on aircraft Flaws in manufacturer quality control process - anti-ice fluid specifications (HOT)	309 310				
	inadequate anti-ice fluid holdover Time (HOT)	11				+
	Convective weather encounter	18				
	Extreme icing conditions encounter	20				
İ	Adverse weather / poor visibility conditions / darkness	6				
	Extreme icing condition and / or heavy snow. Break in airport operation due to adverse	31				
	weather or / and necessity of RWY surface maintenance.					
	Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	129				
+	distribution	120		+		1
	Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130				
+	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				+
	or / and passive contribution to the PF duties	-51				
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168				
	Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.	210				
1	Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT)	212				1
	Inadequate certification process and / or flaws in methodology concerning verification	213				
	of the system / product compliance with requirements - antiice fluid HOT					
+	Lack of adherence to TO procedure in terms of antiice protection	297				+
+	Flaws in manufacturer quality control process - anti-ice fluid specifications (HOT)	310				+
18 TO06B4211		26		13;	41;	48; 50; 51; 54; 55;
	instruments					60; 61; 62; 63
	Flaws in aircraft system maintenance process definition - stickshaker	136				
	Flaws in maintenance technician / airworthiness specialist requirements definition	149				1
1	process and/or training methodology	450		1		+
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
+	distribution Inadequate certification process and / or flaws in methodology concerning verification	161				+
	of the system / product compliance with requirements - stickshaker system	101				
	components					
	Flaws in manufacturer quality control process - Stickshaker system components	266				1
	Convective weather encounter	18				
	Extreme icing conditions encounter	20				
	Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	129				1
	distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition					-
		130	1	1	1	1



Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	Inadequate aircraft de-icing / anti-icing	180				
	Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.	208		+		+
	Applied de-icing / anti-icing method is not sufficient for predicted conditions	228				
	inadequate anti-ice fluid holdover Time (HOT)	11				
	Convective weather encounter	18 20				
	Extreme icing conditions encounter Extreme icing condition and / or heavy snow. Break in airport operation due to adverse	31				
	weather or / and necessity of RWY surface maintenance.	-				
	Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	129				
	distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition	130		+		+
	process and/or training methodology	130				
	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
	or / and passive contribution to the PF duties	167				
	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	168		+		+
	Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.	210				
	Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT)	212				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - antiice fluid HOT	213				
	of the system / product compliance with requirements - antifice maid not					
	Lack of adherence to SOP in terms of pre-flight inspections - ice presence on aircraft	309				
	Flaws in manufacturer quality control process - anti-ice fluid specifications (HOT)	310				
	inadequate anti-ice fluid holdover Time (HOT) Convective weather encounter	11 18		+		
	Extreme icing conditions encounter	20				
	Adverse weather / poor visibility conditions / darkness	6				
	Extreme icing condition and / or heavy snow. Break in airport operation due to adverse	31				
	weather or / and necessity of RWY surface maintenance. Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	129				
	distribution	123				
	Flaws in vehicle driver / equipment operator / ground agent requirements definition	130				
	process and/or training methodology	454				
	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151				
	Pilot tiredness - Inadequate workload distribution	167		+		+
	Flaws in pilot requirements definition process and/or training methodology	168				
	Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.	210				
	Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT) Inadequate certification process and / or flaws in methodology concerning verification	212		+		+
	of the system / product compliance with requirements - antiice fluid HOT	213				
	Lack of adherence to TO procedure in terms of antiice protection	297				
TO06B4212	Flaws in manufacturer quality control process - anti-ice fluid specifications (HOT) Contaminated wing	310 12		13;	41;	48; 50; 51; 54; 5
100064212	Contaminated wing	12		15,	41,	60; 61; 62; 63
	Extreme icing conditions encounter	20				
	Convective weather encounter	18				
	Extreme icing conditions encounter Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	20 129				
	distribution	129				
	Flaws in vehicle driver / equipment operator / ground agent requirements definition	130				
	process and/or training methodology					
	Inadequate aircraft de-icing / anti-icing Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing	180 208		+		+
	Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.	210				
		210				
	Applied de-icing / anti-icing method is not sufficient for predicted conditions	228				
	Applied de-icing / anti-icing method is not sufficient for predicted conditions inadequate anti-ice fluid holdover Time (HOT)	228 11				+
	Applied de-icing / anti-icing method is not sufficient for predicted conditions inadequate anti-ice fluid holdover Time (HOT) Convective weather encounter	228 11 18				
	Applied de-icing / anti-icing method is not sufficient for predicted conditions inadequate anti-ice fluid holdover Time (HOT)	228 11				
	Applied de-icing / anti-icing method is not sufficient for predicted conditions inadequate anti-ice fluid holdover Time (HOT) Convective weather encounter Extreme icing conditions encounter Extreme icing condition and / or heavy snow. Break in airport operation due to adverse weather or / and necessity of RWY surface maintenance.	228 11 18 20 31				
	Applied de-icing / anti-icing method is not sufficient for predicted conditions inadequate anti-ice fluid holdover Time (HOT) Convective weather encounter Extreme icing conditions encounter Extreme icing condition and / or heavy snow. Break in airport operation due to adverse weather or / and necessity of RWY surface maintenance. Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	228 11 18 20				
	Applied de-icing / anti-icing method is not sufficient for predicted conditions inadequate anti-ice fluid holdover Time (HOT) Convective weather encounter Extreme icing conditions encounter Extreme icing conditions and / or heavy snow. Break in airport operation due to adverse weather or / and necessity of RWY surface maintenance. Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	228 11 18 20 31				
	Applied de-icing / anti-icing method is not sufficient for predicted conditions inadequate anti-ice fluid holdover Time (HOT) Convective weather encounter Extreme icing conditions encounter Extreme icing condition and / or heavy snow. Break in airport operation due to adverse weather or / and necessity of RWY surface maintenance. Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	228 11 18 20 31				
	Applied de-icing / anti-icing method is not sufficient for predicted conditions inadequate anti-ice fluid holdover Time (HOT) Convective weather encounter Extreme icing conditions encounter Extreme icing conditions encounter Extreme icing condition and / or heavy snow. Break in airport operation due to adverse weather or / and necessity of RWY surface maintenance. Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	228 11 18 20 31				
	Applied de-icing / anti-icing method is not sufficient for predicted conditions inadequate anti-ice fluid holdover Time (HOT) Convective weather encounter Extreme icing conditions encounter Extreme icing conditions encounter Extreme icing condition and / or heavy snow. Break in airport operation due to adverse weather or / and necessity of RWY surface maintenance. Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	228 11 18 20 31 129 130				
	Applied de-icing / anti-icing method is not sufficient for predicted conditions inadequate anti-ice fluid holdover Time (HOT) Convective weather encounter Extreme icing conditions encounter Extreme icing conditions encounter Extreme icing condition and / or heavy snow. Break in airport operation due to adverse weather or / and necessity of RWY surface maintenance. Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution	228 11 18 20 31 129 130 151				
	Applied de-icing / anti-icing method is not sufficient for predicted conditions inadequate anti-ice fluid holdover Time (HOT) Convective weather encounter Extreme icing conditions encounter Extreme icing conditions encounter Extreme icing condition and / or heavy snow. Break in airport operation due to adverse weather or / and necessity of RWY surface maintenance. Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	228 11 18 20 31 129 130				
	Applied de-icing / anti-icing method is not sufficient for predicted conditions inadequate anti-ice fluid holdover Time (HOT) Convective weather encounter Extreme icing conditions encounter Extreme icing conditions encounter Extreme icing conditions encounter Extreme icing condition and / or heavy snow. Break in airport operation due to adverse weather or / and necessity of RWY surface maintenance. Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot equirements definition process and/or training methodology Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure. Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT)	11 18 20 31 129 130 151 167 168 210 212				
	Applied de-icing / anti-icing method is not sufficient for predicted conditions inadequate anti-ice fluid holdover Time (HOT) Convective weather encounter Extreme icing conditions encounter Extreme icing conditions encounter Extreme icing conditions encounter Extreme icing condition and / or heavy snow. Break in airport operation due to adverse weather or / and necessity of RWY surface maintenance. Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology. Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure. Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT) Inadequate certification process and / or flaws in methodology concerning verification	11 18 20 31 129 130 151 167 168 210				
	Applied de-icing / anti-icing method is not sufficient for predicted conditions inadequate anti-ice fluid holdover Time (HOT) Convective weather encounter Extreme icing conditions encounter Extreme icing conditions encounter Extreme icing conditions encounter Extreme icing condition and / or heavy snow. Break in airport operation due to adverse weather or / and necessity of RWY surface maintenance. Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot equirements definition process and/or training methodology Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure. Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT)	11 18 20 31 129 130 151 167 168 210 212				
	Applied de-icing / anti-icing method is not sufficient for predicted conditions inadequate anti-ice fluid holdover Time (HOT) Convective weather encounter Extreme icing conditions encounter Extreme icing conditions encounter Extreme icing conditions encounter Extreme icing condition and / or heavy snow. Break in airport operation due to adverse weather or / and necessity of RWY surface maintenance. Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology. Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure. Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT) Inadequate certification process and / or flaws in methodology concerning verification	11 18 20 31 129 130 151 167 168 210 212				
	Applied de-icing / anti-icing method is not sufficient for predicted conditions inadequate anti-ice fluid holdover Time (HOT) Convective weather encounter Extreme icing conditions encounter Extreme icing conditions encounter Extreme icing conditions encounter Extreme icing condition and / or heavy snow. Break in airport operation due to adverse weather or / and necessity of RWY surface maintenance. Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology. Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure. Lack of adherence to SOP in terms of fatti-icing fluid Holdover time (HOT) Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - antiice fluid HOT Lack of adherence to SOP in terms of pre-flight inspections - ice presence on aircraft Flaws in manufacturer quality control process - anti-ice fluid specifications (HOT)	228 11 18 20 31 129 130 151 167 168 210 212 213				
	Applied de-icing / anti-icing method is not sufficient for predicted conditions inadequate anti-ice fluid holdover Time (HOT) Convective weather encounter Extreme icing conditions encounter Extreme icing conditions encounter Extreme icing conditions encounter Extreme icing condition and / or heavy snow. Break in airport operation due to adverse weather or / and necessity of RWY surface maintenance. Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure. Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT) Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - antiice fluid HOT Lack of adherence to SOP in terms of pre-flight inspections - ice presence on aircraft Flaws in manufacturer quality control process - anti-ice fluid specifications (HOT) inadequate anti-ice fluid holdover Time (HOT)	228 11 18 20 31 129 130 151 167 168 210 212 213 309 310 11				
	Applied de-icing / anti-icing method is not sufficient for predicted conditions inadequate anti-ice fluid holdover Time (HOT) Convective weather encounter Extreme icing conditions encounter Extreme icing conditions encounter Extreme icing conditions encounter Extreme icing condition and / or heavy snow. Break in airport operation due to adverse weather or / and necessity of RWY surface maintenance. Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure. Lack of adherence to SOP in terms of inti-icing fluid Holdover time (HOT) Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - antiice fluid HOT Lack of adherence to SOP in terms of pre-flight inspections - ice presence on aircraft Flaws in manufacturer quality control process - anti-ice fluid specifications (HOT) inadequate anti-ice fluid holdover Time (HOT) Convective weather encounter	228 11 18 20 31 129 130 151 167 168 212 213 309 310 11 18				
	Applied de-icing / anti-icing method is not sufficient for predicted conditions inadequate anti-ice fluid holdover Time (HOT) Convective weather encounter Extreme icing conditions encounter Extreme icing conditions encounter Extreme icing conditions encounter Extreme icing condition and / or heavy snow. Break in airport operation due to adverse weather or / and necessity of RWY surface maintenance. Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure. Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT) Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - antiice fluid HOT Lack of adherence to SOP in terms of pre-flight inspections - ice presence on aircraft Flaws in manufacturer quality control process - anti-ice fluid specifications (HOT) inadequate anti-ice fluid holdover Time (HOT)	228 11 18 20 31 129 130 151 167 168 210 212 213 309 310 11				



1	precursors ar	10 5.	I	1		safety cert
						SPIs: System of
Code	Identifiable precursors	No. 129	SPIs: Technology	SPIs: Human	SPIs: Organisation	Organisations
	distribution	123				
	Flaws in vehicle driver / equipment operator / ground agent requirements definition	130				
	process and/or training methodology Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
	or / and passive contribution to the PF duties					
	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168				
	Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.	210				+
	Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT)	212				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - antiice fluid HOT	213				
	or the system / product compliance with requirements and the multi-norm					
	Lack of adherence to TO procedure in terms of antiice protection	297				
20 TO06B422	Flaws in manufacturer quality control process - anti-ice fluid specifications (HOT) Pilot tiredness - Inadequate workload distribution	310 167		13;	41;	48; 50; 51; 54; 55; 5
	·			-/	<u>'</u>	60; 61; 62; 63
	Flaws in pilot requirements definition process and/or training methodology	168 197				
	Lack of adherence to SOP in terms of awareness on supporting systems warning - stickshaker	197				
	Convective weather encounter	18				
+	Extreme icing conditions encounter Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	20 129				
	distribution	123				
	Flaws in vehicle driver / equipment operator / ground agent requirements definition	130				
	process and/or training methodology Inadequate aircraft de-icing / anti-icing	180				+
	Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing	208				
	Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.	210				
	Applied de-icing / anti-icing method is not sufficient for predicted conditions inadequate anti-ice fluid holdover Time (HOT)	228 11				+
	Convective weather encounter	18				
	Extreme icing conditions encounter	20				
	Extreme icing condition and / or heavy snow. Break in airport operation due to adverse weather or / and necessity of RWY surface maintenance.	31				
	Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	129				
	distribution	130				
	Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130				
	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
	or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168				
	Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.	210				
	Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT) Inadequate certification process and / or flaws in methodology concerning verification	212				
	of the system / product compliance with requirements - antiice fluid HOT	213				
	Lack of adherence to SOP in terms of pre-flight inspections - ice presence on aircraft	309				+
	Flaws in manufacturer quality control process - anti-ice fluid specifications (HOT)	310				
	inadequate anti-ice fluid holdover Time (HOT)	11				
	Convective weather encounter Extreme icing conditions encounter	18 20				+
	Adverse weather / poor visibility conditions / darkness	6				
	Extreme icing condition and / or heavy snow. Break in airport operation due to adverse	31				
+	weather or / and necessity of RWY surface maintenance. Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	129				
1	distribution					
	Flaws in vehicle driver / equipment operator / ground agent requirements definition	130				
+	process and/or training methodology Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
	or / and passive contribution to the PF duties					1
	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168				+
	Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.	210				
	Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT)	212				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - antiice fluid HOT	213		_		T
1	, , , , , , , , , , , , , , , , , , , ,					
	Lack of adherence to TO procedure in terms of antiice protection Flaws in manufacturer quality control process - anti-ice fluid specifications (HOT)	297 310				
8 Code	Identifiable Precursors	210	Technology	Human	Organisation	System of
		_				Organisations
0	Aircraft encounters a performance decreasing windshear after rotation Convective weather encounter	18		22;	36; 37; 39;	48; 50; 51; 54; 55;
				,	55, 57, 55,	59; 60; 61; 62;
	Frontal surface encounter	64				
	Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles	225				
	locations (e.g. mountains).	L				
1 TO08B111	Lack of adherence to the current technology standards in terms of flight safety	355		22;	36; 37; 39;	48; 50; 51; 54; 55;
	supporting systems. Lack of LLWAS System. Convective weather encounter	18		+		59; 60; 61; 62;
		120				



						SPIs: System of
Code	Identifiable precursors		SPIs: Technology	SPIs: Human	SPIs: Organisation	Organisations
	Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles	225				
	locations (e.g. mountains).					
TO08B112	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149		22;	36; 37; 39;	48; 50; 51; 54; 5! 59; 60; 61; 62;
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				33, 00, 01, 02,
	distribution					
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - LLWAS system	356				
	Convective weather encounter	18				
	Frontal surface encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of	64 225				
	RWY parameters and location, attitude, approach path parameters and obstacles	223				
T00000442	locations (e.g. mountains).	427		22	26 27 20	40.50.54.54.5
TO08B113	Traffic controller tiredness - Inadequate workload distribution	137		22;	36; 37; 39;	48; 50; 51; 54; 5! 59; 60; 61; 62;
	Flaws in traffic controller requirements definition process and/or training methodology	145				
	leady of adhagenes to COD for AID progrations in terms of election of flight array of	214				+
	Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared	214				
	Convective weather encounter	18				
	Frontal surface encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of	64 225	 	+		+
	RWY parameters and location, attitude, approach path parameters and obstacles	223				
T0000134	locations (e.g. mountains).	24-		22.	20, 27, 20	40.50.54.51
TO08B121	Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System.	215		22;	36; 37; 39;	48; 50; 51; 54; 55 59; 60; 61; 62;
	Convective weather encounter	18				33, 00, 01, 02,
	Frontal surface encounter	64				
	Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles	225				
	locations (e.g. mountains).					
TO08B122	System failure affecting the operation of primary instruments / displays or standby instruments	26		22;	36; 37; 39;	48; 50; 51; 54; 5! 59; 60; 61; 62;
	Flaws in maintenance technician / airworthiness specialist requirements definition	149				33, 00, 01, 02,
	process and/or training methodology					
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150				
	Inadequate certification process and / or flaws in methodology concerning verification	253				
	of the system / product compliance with requirements - PWS system	200				
	Flaws in manufacturer quality control process - PWS system components Convective weather encounter	298 18				+
	Frontal surface encounter	64				
	Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles	225				
	locations (e.g. mountains).					
TO08B13	Pilot tiredness - Inadequate workload distribution	167		22;	36; 37; 39;	48; 50; 51; 54; 55
	Flaws in pilot requirements definition process and/or training methodology	168				59; 60; 61; 62;
	Convective weather encounter	18				
	Frontal surface encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of	64 225				+
	RWY parameters and location, attitude, approach path parameters and obstacles	223				
	locations (e.g. mountains).					
TO08B21	not identifiable at that level			22;	36; 37; 39;	48; 50; 51; 54; 5! 59; 60; 61; 62;
	Convective weather encounter	18				, 30, 01, 02,
	Frontal surface encounter	64				
	Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles	225				
	locations (e.g. mountains).	\perp	ļ			
	System failure affecting the operation of primary instruments / displays or standby instruments	26				
	Traffic controller tiredness - Inadequate workload distribution	137				
	Flaws in traffic controller requirements definition process and/or training methodology	145				
	Flaws in maintenance technician / airworthiness specialist requirements definition	149				+
	process and/or training methodology					
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
	distribution Pilot tiredness - Inadequate workload distribution	167	 	+		
	Flaws in pilot requirements definition process and/or training methodology	168				
	Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on	214	_			
	windshear appeared Lack of adherence to the current technology standards in terms of flight safety	215	 			1
	supporting systems. Lack of PWS System.					
	Inadequate certification process and / or flaws in methodology concerning verification	253				
	of the system / product compliance with requirements - PWS system Flaws in manufacturer quality control process - PWS system components	298	 	+		+
			<u> </u>			1
	Lack of adherence to the current technology standards in terms of flight safety	355				
	supporting systems. Lack of LLWAS System.					
		356				



	precursors ar	iu sr	15			safety ce
						CDI Contant of
Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	Convective weather encounter	18	or is recimology	or ior riaman	or for organisation	O gambations
	Frontal surface encounter	64				
	Lack of adherence to SARPs included in Annex 14 and related documents in terms of	225				
	RWY parameters and location, attitude, approach path parameters and obstacles					
	locations (e.g. mountains). System failure affecting the operation of primary instruments / displays or standby	26				
	instruments					
	Traffic controller tiredness - Inadequate workload distribution	137				
	Flaws in traffic controller requirements definition process and/or training methodology	145				
	Flavoria maiatana ana tankaisian / ain matki ana ana sisliat na minana ata dafiriti a	140				
	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149				
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
	distribution					
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168				
	Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on	214				
	windshear appeared Lack of adherence to the current technology standards in terms of flight safety	215				
	supporting systems. Lack of PWS System.	213				
	Inadequate certification process and / or flaws in methodology concerning verification	253				
	of the system / product compliance with requirements - PWS system					
	Flaws in manufacturer quality control process - PWS system components	298				
	Lack of adherence to the current technology standards in terms of flight safety	355				
+	supporting systems. Lack of LLWAS System. Inadequate certification process and / or flaws in methodology concerning verification	356		+		
	of the system / product compliance with requirements - LLWAS system	330				
9 TO08B222	Pilot tiredness - Inadequate workload distribution	167		22;	36; 37; 39;	48; 50; 51; 54; 55;
		$oxed{oxed}$				59; 60; 61; 62;
	Flaws in pilot requirements definition process and/or training methodology	168				
	Lack of adherence to emergency procedures - WEM Convective weather encounter	173 18				
	Frontal surface encounter	64				
	Lack of adherence to SARPs included in Annex 14 and related documents in terms of	225				
	RWY parameters and location, attitude, approach path parameters and obstacles					
	locations (e.g. mountains).					
	System failure affecting the operation of primary instruments / displays or standby	26				
	instruments					
	Traffic controller tiredness - Inadequate workload distribution	137				
	Flaws in traffic controller requirements definition process and/or training methodology	145				
	Flaws in maintenance technician / airworthiness specialist requirements definition	149				
	process and/or training methodology					
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
	distribution					
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on	168 214				
	windshear appeared	214				
	Lack of adherence to the current technology standards in terms of flight safety	215				
	supporting systems. Lack of PWS System.					
	Inadequate certification process and / or flaws in methodology concerning verification	253				
+	of the system / product compliance with requirements - PWS system	200		+		-
+	Flaws in manufacturer quality control process - PWS system components Lack of adherence to the current technology standards in terms of flight safety	298 355		+		
1	supporting systems. Lack of LLWAS System.	222				
1	Inadequate certification process and / or flaws in methodology concerning verification	356				
	of the system / product compliance with requirements - LLWAS system	\perp				
10 TO08B31	not identifiable at that level			22;	36; 37; 39;	48; 50; 51; 54; 55;
+	Converting weather an experience	10		+		59; 60; 61; 62;
	Convective weather encounter Frontal surface encounter	18 64				+
+	Lack of adherence to SARPs included in Annex 14 and related documents in terms of	225				
1	RWY parameters and location, attitude, approach path parameters and obstacles	_				
	locations (e.g. mountains).					
	System failure affecting the operation of primary instruments / displays or standby	26				
	instruments	40=				1
	Traffic controller tiredness - Inadequate workload distribution	137				
	Flaws in traffic controller requirements definition process and/or training methodology	145				
	Flaws in maintenance technician / airworthiness specialist requirements definition	149				
	process and/or training methodology	Ĺ				
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
	distribution	\vdash				
	Pilot tiredness - Inadequate workload distribution	167				
+	Flaws in pilot requirements definition process and/or training methodology	168				
1	Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared	214				
	Lack of adherence to the current technology standards in terms of flight safety	215				
	supporting systems. Lack of PWS System.	[
	Inadequate certification process and / or flaws in methodology concerning verification	253				
	of the system / product compliance with requirements - PWS system	1				
						1
	Flaws in manufacturer quality control process - PWS system components Lack of adherence to the current technology standards in terms of flight safety	298 355				_



						SPIs: System of	
Code	Identifiable precursors Inadequate certification process and / or flaws in methodology concerning verification	No. 356	SPIs: Technology	SPIs: Human	SPIs: Organisation	Organisations	
	of the system / product compliance with requirements - LLWAS system	330					
	Convective weather / turbulence / windshear or crosswind conditions during take-off	32					
	Dilet tire decent to adequate module ad distribution	167					
	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	168					
	Lack of adherence to emergency procedures - WEM	173					
11 TO08B32	Pilot tiredness - Inadequate workload distribution	167		22;	36; 37; 39;	48; 50; 51; 54; 55; 5	
	Flaws in pilot requirements definition process and/or training methodology	168				59; 60; 61; 62;	
	Lack of adherence to AFM in terms of emergency procedures - windshear recovery	357					
	Convective weather encounter	18					
	Frontal surface encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of	64 225					
	RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).						
	System failure affecting the operation of primary instruments / displays or standby instruments Traffic controller tiredness - Inadequate workload distribution	26 137					
	Flaws in traffic controller requirements definition process and/or training methodology	145				+	
	Flaws in maintenance technician / airworthiness specialist requirements definition	149					
+	process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150		+			
	distribution						
	Pilot tiredness - Inadequate workload distribution	167					
	Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on	168 214	+	+		+	
	windshear appeared						
	Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System.	215					
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system	253					
	Flaws in manufacturer quality control process - PWS system components	298					
	Lack of adherence to the current technology standards in terms of flight safety	355					
	supporting systems. Lack of LLWAS System.	256					
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - LLWAS system	356					
	Convective weather / turbulence / windshear or crosswind conditions during take-off	32					
	Pilot tiredness - Inadequate workload distribution	167					
	Flaws in pilot requirements definition process and/or training methodology	168					
12 TO08B33	Lack of adherence to emergency procedures - WEM Pilot tiredness - Inadequate workload distribution	173 167		22;	36; 37; 39;	48; 50; 51; 54; 55; 59; 60; 61; 62;	
	Flaws in pilot requirements definition process and/or training methodology	168					
	Lack of adherence to AFM in terms of emergency procedures - windshear recovery	357					
	Convective weather encounter Frontal surface encounter	18 64				+	
	Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).	225					
	System failure affecting the operation of primary instruments / displays or standby instruments	26					
	Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology	137 145	-				
	Flaws in traine controller requirements definition process and/or training methodology Flaws in maintenance technician / airworthiness specialist requirements definition	145					
	process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150					
	distribution Pilot tiredness - Inadequate workload distribution	10-				+	
	Flaws in pilot requirements definition process and/or training methodology	167 168					
	Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared	214					
	Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System.	215					
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system Flaws in manufacturer quality control process - PWS system components	253 298					
	Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.	355					
	supporting systems. Lack of LLWAS System. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - LLWAS system	356					
	Convective weather / turbulence / windshear or crosswind conditions during take-off	32					
+	Pilot tiredness - Inadequate workload distribution	167	-			1	
	Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM	168 173				+	
13 TO08B34	Pilot tiredness - Inadequate workload distribution	167		22;	36; 37; 39;	48; 50; 51; 54; 55;	
						59; 60; 61; 62;	
	Flaws in pilot requirements definition process and/or training methodology Lack of adherence to AFM in terms of emergency procedures - windshear recovery	168 357				1	
+	Convective weather encounter	18				+	
		64		1	_	1	



	Code	Identifiable precursors	No	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	code	Lack of adherence to SARPs included in Annex 14 and related documents in terms of	225	3FIS. Technology	SFIS. Hulliali	3Fis. Organisation	Organisations
		RWY parameters and location, attitude, approach path parameters and obstacles					
		locations (e.g. mountains).					
		System failure affecting the operation of primary instruments / displays or standby instruments	26				
		Traffic controller tiredness - Inadequate workload distribution	137				
		Flaws in traffic controller requirements definition process and/or training methodology	145				
		Flaws in maintenance technician / airworthiness specialist requirements definition	149				-
		process and/or training methodology	149				
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
		distribution					
		Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168				+
		Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on	214				+
		windshear appeared					
		Lack of adherence to the current technology standards in terms of flight safety	215				
		supporting systems. Lack of PWS System.					
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system	253				
		Flaws in manufacturer quality control process - PWS system components	298		1		
		Lack of adherence to the current technology standards in terms of flight safety	355				
		supporting systems. Lack of LLWAS System.	95.				
		Inadequate certification process and / or flaws in methodology concerning verification	356				1
		of the system / product compliance with requirements - LLWAS system Convective weather / turbulence / windshear or crosswind conditions during take-off	32		+		+
		and on	Ĺ		<u></u>	<u> </u>	<u> </u>
		Pilot tiredness - Inadequate workload distribution	167	ļ			1
		Flaws in pilot requirements definition process and/or training methodology	168				
11	Code	Lack of adherence to emergency procedures - WEM Identifiable Precursors	173 No.	Technology	Human	Organisation	System of
11	Code	identifiable Precuisors	INO.	reciliology	numan	Organisation	Organisations
ı		Fire on-board aircraft					
1	ER11B11	Cargo loading unsecured / shift	17	9;			50; 51; 54; 55; 58;
		Military I and the standard of	420				60; 61; 62; 63
		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129				
		Flaws in vehicle driver / equipment operator / ground agent requirements definition	130				
		process and/or training methodology					
		Pilot tiredness - Inadequate workload distribution	167				
		Flaws in pilot requirements definition process and/or training methodology	168				
2	ER11B1211	Lack of adherence to regulations concerning transport of DGR goods Wildlife incursion	359 5	4;	11; 15; 16; 18; 19; 20; 21; 22;	31; 32; 33; 34; 35; 36; 37; 38; 39; 43; 44	45; 50; 51; 52; 53; 55; 58; 59; 60; 61; 63
		Contaminated Runway	39				
		Midair collision	66				
		Collision with ground obstacle	67				
		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.	216				
		Separation of structural element / component of the aircraft during take-off or landing	360				
_	ER11B1212		4.40				50; 51; 55; 56; 59;
3	EKIIBIZIZ	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149	4;			61; 62; 63
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				, , , , , ,
		distribution					1
_	ER11B1213	Flaws in aircraft system maintenance process definition - Fuel system components	361	4.	+		E0. E1. E5. 50. 50
4	FV1101512	Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129	₹,			50; 51; 55; 56; 59; 61; 62; 63
		Flaws in vehicle driver / equipment operator / ground agent requirements definition	130				7
		process and/or training methodology					1
_	ER11B122	Lack of adherence to SOP in terms of fuelling procedure Flaws in maintenance technician / airworthiness specialist requirements definition	218	4.	+		E0. E1. E5. 50. 50
5	FV110155	process and/or training methodology	149	₹,			50; 51; 55; 56; 59; 61; 62; 63
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				-,,,
		distribution					1
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fuel system components	352				
		Flaws in aircraft system maintenance process definition - Fuel system compoonents	361				
6	ER11B13	Flaws in maintenance technician / airworthiness specialist requirements definition	149	5;			50; 51; 55; 56; 59;
_		process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150		+		61; 62; 63
		distribution	130				1
			333				1
		of the system / product compliance with requirements - Hydraulic system components					1
			00.				
	I .	Flaws in aircraft system maintenance process definition - Hydraulic System	334		+	1	
_	ED11D14	Flaws in maintenance technician / aircrathings specialist as wisers and deficite	140				
7	ER11B14	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149	2; 7;			50; 51; 55; 56; 59; 61; 62; 63
7	ER11B14	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	149 150	2; 7;			61; 62; 63



		precursors ar	iu sr	15	safety certificati		
							SPIs: System of
ď	Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	Organisations
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements in terms of fire resistance	354				
8 E	ER11B15	Volcanic ash encounter	22	9;			50; 51; 55; 56; 59; 60 61; 62; 63
		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149				
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150				
		Pilot tiredness - Inadequate workload distribution	167				
_		Flaws in pilot requirements definition process and/or training methodology Lack of adherence to engine limitations	168 409				
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components	454				
		Flaws in manufacturer quality control process - Engine systems and / or components Flaws in aircraft system maintenance process definition - Engine systems and / or	458 463				
9 E	R11B16	components Volcanic ash encounter	22	9;			50; 51; 55; 56; 59; 60
_							61; 62; 63
		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149				
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150				
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or	464				
\dashv		components Flaws in manufacturer quality control process - APU systems and / or components	465				+
		Flaws in aircraft system maintenance process definition - APU systems and / or	466				
10 E	R11B21	components Flaws in maintenance technician / airworthiness specialist requirements definition	149	2:			50; 51; 55; 56; 59; 60
		process and/or training methodology		-			61; 62; 63
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150				
		Flaws in aircraft system maintenance process definition - Electrical wiring System	252				
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Electrical / wiring system components	467				
		Flaws in manufacturer quality control process - Electrical / wiring systems components	468				
11 E	R11B22	Cargo loading unsecured / shift	17				50; 51; 55; 56; 59; 60 61; 62; 63
		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149				
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150				
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements in terms of fire resistance	354				
		Inadequate maintenance of fire vulnerable aircraft parts or components	353				
12 E	ER11B31	Lack of adherence to regulations concerning transport of DGR goods Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	359 149	2; 4; 5; 7; 9;	11; 15; 16; 18; 19; 20; 21; 22;	31; 32; 33; 34; 35; 36; 37; 38; 39; 43; 44	45; 50; 51; 52; 53; 5 55; 56; 58; 59; 60; 6 62; 63
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150				
		Flaws in aircraft system maintenance process definition - Fire detection system components	474				
T		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components	475				
_		Flaws in manufacturer quality control process - Fire detection system components	476				
\dashv		Wildlife incursion Cargo loading unsecured / shift	5 17	 	+		+
_		Volcanic ash encounter	22				
\dashv		Contaminated Runway Midair collision	39 66			+	+
_		Collision with ground obstacle	67				
		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129				
\dashv		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Flaws in maintenance technician / airworthiness specialist requirements definition	149				
\dashv		process and/or training methodology Maintenance technician / airworthiness specialist frequirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
		distribution					
\dashv		Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168	1		+	+
		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of	_				
\pm		contaminations. Lack of adherence to SOP in terms of fuelling procedure	218	<u> </u>			
4		Flaws in aircraft system maintenance process definition - Electrical wiring System	252				
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components	333				



		precursors ar	iu sp	15		safety certification	
				1			
	Code	Identifiable precursors	No	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	coue	Flaws in aircraft system maintenance process definition - Hydraulic System	334	3FIS. Technology	JFIS. HUIIIAII	3FIS. OIGAINSALION	Organisations
		Inadequate certification process and / or flaws in methodology concerning verification	352				
		of the system / product compliance with requirements - Fuel system components					
_							
_		Inadequate maintenance of fire vulnerable aircraft parts or components	353 354			-	
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements in terms of fire resistance	354				
		Lack of adherence to regulations concerning transport of DGR goods	359				
		Separation of structural element / component of the aircraft during take-off or landing	360				
_			264				
_		Flaws in aircraft system maintenance process definition - Fuel system compoonents Lack of adherence to engine limitations	361 409				
		Inadequate certification process and / or flaws in methodology concerning verification	454				
		of the system / product compliance with requirements - Engine systems and / or					
		components					
_		Flaws in manufacturer quality control process - Engine systems and / or components	458				
		Flaws in aircraft system maintenance process definition - Engine systems and / or	463				
\dashv		components Inadequate certification process and / or flaws in methodology concerning verification	464	 	+	+	+
		of the system / product compliance with requirements - APU systems and / or	704				1
		components	1				1
		Flaws in manufacturer quality control process - APU systems and / or components	465				
\Box		Flaws in aircraft system maintenance process definition - APU systems and / or	466				
_		components	45-	-	1		1
		Inadequate certification process and / or flaws in methodology concerning verification	467				1
		of the system / product compliance with requirements - Electrical / wiring system components	1				1
\dashv		Flaws in manufacturer quality control process - Electrical / wiring systems components	468		1		†
13	ER11B32	Flaws in maintenance technician / airworthiness specialist requirements definition	149	2; 3; 4; 5; 7; 9;	11; 15; 16; 18; 19; 20;	31; 32; 33; 34; 35; 36;	45; 50; 51; 52; 53; 54
		process and/or training methodology			21; 22;	37; 38; 39; 43; 44	55; 56; 58; 59; 60; 63
_		Maria de la compania del compania del compania de la compania del compania del compania de la compania de la compania dela	450				62; 63
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150				
		Flaws in aircraft system maintenance process definition - Fire warning system	477				+
		Inadequate certification process and / or flaws in methodology concerning verification	478				
		of the system / product compliance with requirements - Fire warning system					
		Flaws in manufacturer quality control process - Fire warning system	479				
_		Wildlife incursion	5				
-		Cargo loading unsecured / shift Volcanic ash encounter	17 22			-	
		Contaminated Runway	39				
		Midair collision	66				
		Collision with ground obstacle	67				
		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	129				
_		distribution	420				
		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130				
		Flaws in maintenance technician / airworthiness specialist requirements definition	149				
		process and/or training methodology					
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
		distribution					
_		Pilot tiredness - Inadequate workload distribution	167	-	1		1
-		Flaws in pilot requirements definition process and/or training methodology Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of	168	-	+		+
		contaminations.	210				1
\dashv		Lack of adherence to SOP in terms of fuelling procedure	218				†
		Flaws in aircraft system maintenance process definition - Electrical wiring System	252				
\Box	_	Inadequate certification process and / or flaws in methodology concerning verification	333				
		of the system / product compliance with requirements - Hydraulic system components					1
\dashv		Flaure in aircraft custom maintanana ann an definition 11 dec Par Court	224	-	+		1
\dashv		Flaws in aircraft system maintenance process definition - Hydraulic System Inadequate certification process and / or flaws in methodology concerning verification	334 352	-	+		+
		of the system / product compliance with requirements - Fuel system components	332				1
		, , , , ,	1				
		Inadequate maintenance of fire vulnerable aircraft parts or components	353				
T		Inadequate certification process and / or flaws in methodology concerning verification	354				
		of the system / product compliance with requirements in terms of fire resistance					1
\dashv		Lack of adherence to regulations concerning transport of DGR goods	359	-	+		+
\rightarrow		Separation of structural element / component of the aircraft during take-off or landing	360	 	+		+
		separation of structural element / component of the affect at the first take-on of landing	300				1
\dashv		Flaws in aircraft system maintenance process definition - Fuel system compoonents	361	<u> </u>	1		
		Lack of adherence to engine limitations	409				<u> </u>
\Box	_	Inadequate certification process and / or flaws in methodology concerning verification	454				
		of the system / product compliance with requirements - Engine systems and / or	1				
_		components					1
_		Flaws in manufacturer quality control process - Engine systems and / or components	458	-	+	-	+
		Flaws in aircraft system maintenance process definition - Engine systems and / or components	463				1
- 1		Inadequate certification process and / or flaws in methodology concerning verification	464	 	+		+
				T. Control of the Con	1	1	1
		of the system / product compliance with requirements - APU systems and / or					



	precursors a	iu sr	15		safety certifica	
						SPIs: System of
Code	Identifiable precursors		SPIs: Technology	SPIs: Human	SPIs: Organisation	Organisations
	Flaws in manufacturer quality control process - APU systems and / or components Flaws in aircraft system maintenance process definition - APU systems and / or	465 466				
	components					
	Inadequate certification process and / or flaws in methodology concerning verification	467				
	of the system / product compliance with requirements - Electrical / wiring system					
	components Flaws in manufacturer quality control process - Electrical / wiring systems components	468				
	3,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,					
14 ER11B33	Inadequate certification process and / or flaws in methodology concerning verification	475	2; 4; 5; 7; 9;	11; 15; 16; 18; 19; 20;	31; 32; 33; 34; 35; 36;	45; 50; 51; 52; 53; 54
	of the system / product compliance with requirements - Fire deection system components			21; 22;	37; 38; 39; 43; 44	55; 56; 58; 59; 60; 6 62; 63
	Lack of adherence to the current technology standards in terms of flight safety	220				02, 03
	supporting systems. Lack of fire detection / warning or / and extinguishing system.					
	Wildlife incursion	5				
	Cargo loading unsecured / shift Volcanic ash encounter	17 22				
	Contaminated Runway	39				
	Midair collision	66				
	Collision with ground obstacle	67				
	Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	129				
	distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition	130				
	process and/or training methodology	130				
	Flaws in maintenance technician / airworthiness specialist requirements definition	149				
	process and/or training methodology	150	-	+	1	-
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150				
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168				
	Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence or	f 216				
	contaminations. Lack of adherence to SOP in terms of fuelling procedure	218				
	Flaws in aircraft system maintenance process definition - Electrical wiring System	252				
	Inadequate certification process and / or flaws in methodology concerning verification	333				
	of the system / product compliance with requirements - Hydraulic system components					
	Clause in a insurant an unto an analyst and an analyst and a finite in the describe Contact	334				
	Flaws in aircraft system maintenance process definition - Hydraulic System Inadequate certification process and / or flaws in methodology concerning verification	352				
	of the system / product compliance with requirements - Fuel system components					
	Inadequate maintenance of fire vulnerable aircraft parts or components	353 354				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements in terms of fire resistance	354				
	Lack of adherence to regulations concerning transport of DGR goods	359				
	Separation of structural element / component of the aircraft during take-off or landing	360				
	Flaws in aircraft system maintenance process definition - Fuel system components	361				
	Lack of adherence to engine limitations	409				
	Inadequate certification process and / or flaws in methodology concerning verification	454				
	of the system / product compliance with requirements - Engine systems and / or components					
	Flaws in manufacturer quality control process - Engine systems and / or components	458			+	
	Flaws in aircraft system maintenance process definition - Engine systems and / or	463				
	components					
	Inadequate certification process and / or flaws in methodology concerning verification	464				
	of the system / product compliance with requirements - APU systems and / or components					
	Flaws in manufacturer quality control process - APU systems and / or components	465	<u> </u>		<u> </u>	
	Flaws in aircraft system maintenance process definition - APU systems and / or	466				
	components Inadequate certification process and / or flaws in methodology concerning verification	407	-			
	of the system / product compliance with requirements - Electrical / wiring system	467				
	components	L	<u> </u>			
	Flaws in manufacturer quality control process - Electrical / wiring systems components	468				
15 ER11B34	not identifiable at that level	\vdash	2. 4. 5. 7. 0.	11, 15, 16, 10, 10, 20	31; 32; 33; 34; 35; 36;	45; 50; 51; 52; 53; 54
15 EK11B34	not identifiable at that level		2; 4; 5; 7; 9;	11; 15; 16; 18; 19; 20; 21; 22;	31; 32; 33; 34; 35; 36; 37; 38; 39; 43; 44	45; 50; 51; 52; 53; 5 55; 56; 58; 59; 60; 6 62; 63
	Wildlife incursion	5				
	Cargo loading unsecured / shift	17				
	Volcanic ash encounter Contaminated Runway	22 39				
	Contaminated Runway Midair collision	66				
	Collision with ground obstacle	67				
	Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	129				
	distribution	400				
	Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130				
	Flaws in maintenance technician / airworthiness specialist requirements definition	149				
	process and/or training methodology					
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
	distribution				1	
	Pilot tiredness - Inadequate workload distribution	167				



	precursors ar	T-	1		1	
		No				SPIs: System of
Code	Identifiable precursors Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of		SPIs: Technology	SPIs: Human	SPIs: Organisation	Organisations
	contaminations.	210				
	Lack of adherence to SOP in terms of fuelling procedure	218				
	Flaws in aircraft system maintenance process definition - Electrical wiring System	252				
	Inadequate certification process and / or flaws in methodology concerning verification	333				
	of the system / product compliance with requirements - Hydraulic system components					
	Flaws in aircraft system maintenance process definition - Hydraulic System	334				
	Inadequate certification process and / or flaws in methodology concerning verification	352				
	of the system / product compliance with requirements - Fuel system components					
		\perp				
	Inadequate maintenance of fire vulnerable aircraft parts or components	353				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements in terms of fire resistance	354				
	of the system / product compliance with requirements in terms of the resistance					
	Lack of adherence to regulations concerning transport of DGR goods	359				
	Separation of structural element / component of the aircraft during take-off or landing	360				
		ــــــ				
	Flaws in aircraft system maintenance process definition - Fuel system components	361				
	Lack of adherence to engine limitations Inadequate certification process and / or flaws in methodology concerning verification	409 454				
	of the system / product compliance with requirements - Engine systems and / or					
	components	L	<u> </u>	<u></u>		
	Flaws in manufacturer quality control process - Engine systems and / or components	458	ļ			
	Flaws in aircraft system maintenance process definition - Engine systems and / or	463				
	components Inadequate certification process and / or flaws in methodology concerning verification	464	-	+		
	of the system / product compliance with requirements - APU systems and / or	704				
	components	1	<u> </u>	<u> </u>		
	Flaws in manufacturer quality control process - APU systems and / or components	465				
	Flaws in aircraft system maintenance process definition - APU systems and / or	466				
	components Inadequate certification process and / or flaws in methodology concerning verification	467				
	of the system / product compliance with requirements - Electrical / wiring system	407				
	components					
	Flaws in manufacturer quality control process - Electrical / wiring systems components	468				
		Щ				
16 ER11B411	Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of fire detection / warning or / and extinguishing system.	220	2; 3; 4; 5; 7; 9;	11; 15; 16; 18; 19; 20; 21; 22;	31; 32; 33; 34; 35; 36; 37; 38; 39; 43; 44	45; 50; 51; 52; 53; 5 55; 56; 58; 59; 60; 6
	supporting systems: Educ of the detection, Harring or , and extinguishing systems			21, 22,	37, 30, 33, 13, 11	62; 63
	Inadequate certification process and / or flaws in methodology concerning verification	480				
	of the system / product compliance with requirements - Fire extinguishing system					
	components	5				
	Wildlife incursion Cargo loading unsecured / shift	17				
	Volcanic ash encounter	22				
	Contaminated Runway	39				
	Midair collision	66				
	Collision with ground obstacle Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	67 129				
	distribution	129				
	Flaws in vehicle driver / equipment operator / ground agent requirements definition	130				
	process and/or training methodology	Ш				
	Flaws in maintenance technician / airworthiness specialist requirements definition	149				
	process and/or training methodology					
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150				
	Pilot tiredness - Inadequate workload distribution	167		1		
	Flaws in pilot requirements definition process and/or training methodology	168				
	Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of	216				
	contaminations.	1				
	Lack of adherence to SOP in terms of fuelling procedure Flaws in aircraft system maintenance process definition - Electrical wiring System	218 252	1			
	Inadequate certification process and / or flaws in methodology concerning verification	333				
	of the system / product compliance with requirements - Hydraulic system components					
	· ·	_				
	Flaws in aircraft system maintenance process definition - Hydraulic System	334				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Eyel system components	352				
	of the system / product compliance with requirements - Fuel system components	1				
	Inadequate maintenance of fire vulnerable aircraft parts or components	353	<u> </u>	1		
	Inadequate certification process and / or flaws in methodology concerning verification	354				
1	of the system / product compliance with requirements in terms of fire resistance					
		₩	-			
			I	+		
	Lack of adherence to regulations concerning transport of DGR goods	359				1
	Lack of adherence to regulations concerning transport of DGR goods Separation of structural element / component of the aircraft during take-off or landing					
	Separation of structural element / component of the aircraft during take-off or landing					
		360				
	Separation of structural element / component of the aircraft during take-off or landing Flaws in aircraft system maintenance process definition - Fuel system compoonents Lack of adherence to engine limitations Inadequate certification process and / or flaws in methodology concerning verification	360 361				
	Separation of structural element / component of the aircraft during take-off or landing Flaws in aircraft system maintenance process definition - Fuel system compoonents Lack of adherence to engine limitations Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or	360 361 409				
	Separation of structural element / component of the aircraft during take-off or landing Flaws in aircraft system maintenance process definition - Fuel system components Lack of adherence to engine limitations Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components	360 361 409 454				
	Separation of structural element / component of the aircraft during take-off or landing Flaws in aircraft system maintenance process definition - Fuel system compoonents Lack of adherence to engine limitations Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or	360 361 409				



	precursors ar	10 SF	'IS		safety certificat	
						SPIs: System of
Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	Organisations
	Inadequate certification process and / or flaws in methodology concerning verification	464				
	of the system / product compliance with requirements - APU systems and / or					
	components	405				
	Flaws in manufacturer quality control process - APU systems and / or components Flaws in aircraft system maintenance process definition - APU systems and / or	465 466				
	components	400				
	Inadequate certification process and / or flaws in methodology concerning verification	467				
	of the system / product compliance with requirements - Electrical / wiring system					
	components					
	Flaws in manufacturer quality control process - Electrical / wiring systems components	468				
	Flaws in maintenance technician / airworthiness specialist requirements definition	149				
	process and/or training methodology					
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
	distribution	220				
	Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of fire detection / warning or / and extinguishing system.	220				
	Flaws in aircraft system maintenance process definition - Fire detection system	474				
	components	Ľ	<u> </u>			
	Inadequate certification process and / or flaws in methodology concerning verification	475				
	of the system / product compliance with requirements - Fire deection system					
_	Components Flaws in manufacturer quality control process - Fire detection system components	476		+		
	Flaws in manufacturer quality control process - Fire detection system components Flaws in aircraft system maintenance process definition - Fire warning system	476	+	+		
	Inadequate certification process and / or flaws in methodology concerning verification	477				
	of the system / product compliance with requirements - Fire warning system	"				
		\perp				
	Flaws in manufacturer quality control process - Fire warning system	479				45 50 51 51 51
17 ER11B412	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149	2; 3; 4; 5; 7; 9;	11; 15; 16; 18; 19; 20; 21; 22;	31; 32; 33; 34; 35; 36; 37; 38; 39; 43; 44	45; 50; 51; 52; 53; 54 55; 56; 58; 59; 60; 6
	process and/or training methodology			21; 22;	37; 38; 39; 43; 44	62; 63
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				02, 03
	distribution					
	Inadequate certification process and / or flaws in methodology concerning verification	480				
	of the system / product compliance with requirements - Fire extinguishing system					
	components					
	Flaws in aircraft system maintenance process definition - Fire extinguishing system	481				
	components Flaws in manufacturer quality control process - Fire extinguishing system components	482				
	riaws in manufacturer quality control process - the extinguishing system components	402				
	Wildlife incursion	5				
	Cargo loading unsecured / shift	17				
	Volcanic ash encounter	22				
	Contaminated Runway	39				
	Midair collision Collision with ground obstacle	66 67				
	Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	129			+	
	distribution					
	Flaws in vehicle driver / equipment operator / ground agent requirements definition	130				
	process and/or training methodology					
	Flaws in maintenance technician / airworthiness specialist requirements definition	149				
	process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
1	distribution	130				
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168				
	Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of	216				
	contaminations.	240	1			
	Lack of adherence to SOP in terms of fuelling procedure Flaws in aircraft system maintenance process definition - Electrical wiring System	218 252			+	
	Inadequate certification process and / or flaws in methodology concerning verification	333				
	of the system / product compliance with requirements - Hydraulic system components					
		\perp				
	Flaws in aircraft system maintenance process definition - Hydraulic System	334				
	Inadequate certification process and / or flaws in methodology concerning verification	352				
1	of the system / product compliance with accordance					
	of the system / product compliance with requirements - Fuel system components	1				
		353				1
	of the system / product compliance with requirements - Fuel system components Inadequate maintenance of fire vulnerable aircraft parts or components Inadequate certification process and / or flaws in methodology concerning verification	353 354				
	Inadequate maintenance of fire vulnerable aircraft parts or components	_				
	Inadequate maintenance of fire vulnerable aircraft parts or components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements in terms of fire resistance	354				
	Inadequate maintenance of fire vulnerable aircraft parts or components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements in terms of fire resistance Lack of adherence to regulations concerning transport of DGR goods	354 359				
	Inadequate maintenance of fire vulnerable aircraft parts or components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements in terms of fire resistance	354				
	Inadequate maintenance of fire vulnerable aircraft parts or components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements in terms of fire resistance Lack of adherence to regulations concerning transport of DGR goods Separation of structural element / component of the aircraft during take-off or landing	354 359 360				
	Inadequate maintenance of fire vulnerable aircraft parts or components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements in terms of fire resistance Lack of adherence to regulations concerning transport of DGR goods	354 359				
	Inadequate maintenance of fire vulnerable aircraft parts or components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements in terms of fire resistance Lack of adherence to regulations concerning transport of DGR goods Separation of structural element / component of the aircraft during take-off or landing Flaws in aircraft system maintenance process definition - Fuel system components	354 359 360 361				
	Inadequate maintenance of fire vulnerable aircraft parts or components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements in terms of fire resistance Lack of adherence to regulations concerning transport of DGR goods Separation of structural element / component of the aircraft during take-off or landing Flaws in aircraft system maintenance process definition - Fuel system components Lack of adherence to engine limitations	354 359 360 361 409				
	Inadequate maintenance of fire vulnerable aircraft parts or components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements in terms of fire resistance Lack of adherence to regulations concerning transport of DGR goods Separation of structural element / component of the aircraft during take-off or landing Flaws in aircraft system maintenance process definition - Fuel system components Lack of adherence to engine limitations Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components	359 360 361 409 454				
	Inadequate maintenance of fire vulnerable aircraft parts or components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements in terms of fire resistance Lack of adherence to regulations concerning transport of DGR goods Separation of structural element / component of the aircraft during take-off or landing Flaws in aircraft system maintenance process definition - Fuel system components Lack of adherence to engine limitations Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components	354 359 360 361 409 454				
	Inadequate maintenance of fire vulnerable aircraft parts or components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements in terms of fire resistance Lack of adherence to regulations concerning transport of DGR goods Separation of structural element / component of the aircraft during take-off or landing Flaws in aircraft system maintenance process definition - Fuel system components Lack of adherence to engine limitations Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in aircraft system maintenance process definition - Engine systems and / or	359 360 361 409 454				
	Inadequate maintenance of fire vulnerable aircraft parts or components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements in terms of fire resistance Lack of adherence to regulations concerning transport of DGR goods Separation of structural element / component of the aircraft during take-off or landing Flaws in aircraft system maintenance process definition - Fuel system components Lack of adherence to engine limitations Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in aircraft system maintenance process definition - Engine systems and / or components	354 359 360 361 409 454 458 463				
	Inadequate maintenance of fire vulnerable aircraft parts or components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements in terms of fire resistance Lack of adherence to regulations concerning transport of DGR goods Separation of structural element / component of the aircraft during take-off or landing Flaws in aircraft system maintenance process definition - Fuel system components Lack of adherence to engine limitations Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in aircraft system maintenance process definition - Engine systems and / or	354 359 360 361 409 454				



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						SPIs: System of
Code	Identifiable precursors Flaws in manufacturer quality control process - APU systems and / or components	No. 465	SPIs: Technology	SPIs: Human	SPIs: Organisation	Organisations
	Flaws in aircraft system maintenance process definition - APU systems and / or	466				
	components Inadequate certification process and / or flaws in methodology concerning verification	467				
	of the system / product compliance with requirements - Electrical / wiring system	407				
	components					
	Flaws in manufacturer quality control process - Electrical / wiring systems components	468				
	Flaws in maintenance technician / airworthiness specialist requirements definition	149				1
	process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
	distribution	130				
	Lack of adherence to the current technology standards in terms of flight safety	220				
	supporting systems. Lack of fire detection / warning or / and extinguishing system. Flaws in aircraft system maintenance process definition - Fire detection system	474				
	components					
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system	475				
	components					
	Flaws in manufacturer quality control process - Fire detection system components	476				-
	Flaws in aircraft system maintenance process definition - Fire warning system Inadequate certification process and / or flaws in methodology concerning verification	477 478	 	+		
	of the system / product compliance with requirements - Fire warning system					
	Flaws in manufacturer quality control process - Fire warning system	479	-	+	-	
18 ER11B42	In-flight smoke / fumes / fire (in cockpit, cabin, cargo) events that could affect the crew	29	2; 3; 4; 5; 7; 9;	11; 15; 16; 18; 19; 20;	31; 32; 33; 34; 35; 36;	45; 50; 51; 52; 53; 5
	ability to conduct their duties and/or the aircraft controllability			21; 22;	37; 38; 39; 43; 44	55; 56; 58; 59; 60; 6 62; 63
	Pilot tiredness - Inadequate workload distribution	167				02, 03
	Flaws in pilot requirements definition process and/or training methodology	168				
	Lack of adherence to AFM in terms of emergency procedures - fire detection and extinguishing procedure	483				
	Wildlife incursion	5				
	Cargo loading unsecured / shift	17				-
	Volcanic ash encounter Contaminated Runway	22 39				
	Midair collision	66				
	Collision with ground obstacle Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	67 129				
	distribution	123				
	Flaws in vehicle driver / equipment operator / ground agent requirements definition	130				
	process and/or training methodology Flaws in maintenance technician / airworthiness specialist requirements definition	149				
	process and/or training methodology					
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150				
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of	168				
	contaminations.	210				
	Lack of adherence to SOP in terms of fuelling procedure	218				
	Flaws in aircraft system maintenance process definition - Electrical wiring System Inadequate certification process and / or flaws in methodology concerning verification	252 333				
	of the system / product compliance with requirements - Hydraulic system components					
	Flaws in aircraft system maintenance process definition - Hydraulic System	334				+
	Inadequate certification process and / or flaws in methodology concerning verification	352				
	of the system / product compliance with requirements - Fuel system components					
	Inadequate maintenance of fire vulnerable aircraft parts or components	353				
	Inadequate certification process and / or flaws in methodology concerning verification	354				
	of the system / product compliance with requirements in terms of fire resistance		1			
	Lack of adherence to regulations concerning transport of DGR goods	359				
	Separation of structural element / component of the aircraft during take-off or landing	360				
	Flaws in aircraft system maintenance process definition - Fuel system compoonents	361				
	Lack of adherence to engine limitations	409				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or	454				
	components					
	Flaws in manufacturer quality control process - Engine systems and / or components Flaws in aircraft system maintenance process definition - Engine systems and / or	458 463	-	+	-	
	components	403	<u> </u>			<u> </u>
	Inadequate certification process and / or flaws in methodology concerning verification	464				
	of the system / product compliance with requirements - APU systems and / or components					
	Flaws in manufacturer quality control process - APU systems and / or components	465				
	Flaws in aircraft system maintenance process definition - APU systems and / or	466				
	components Inadequate certification process and / or flaws in methodology concerning verification	467	 	+		
1	of the system / product compliance with requirements - Electrical / wiring system					
	components Flaws in manufacturer quality control process - Electrical / wiring systems components	468	-	+	-	
1		1700			1	



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							SPIs: System of
- (Code	Identifiable precursors Flaws in maintenance technician / airworthiness specialist requirements definition	No. 149	SPIs: Technology	SPIs: Human	SPIs: Organisation	Organisations
		process and/or training methodology	149				
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
		distribution					
		Lack of adherence to the current technology standards in terms of flight safety	220				
_		supporting systems. Lack of fire detection / warning or / and extinguishing system. Flaws in aircraft system maintenance process definition - Fire detection system	474				
		components					
		Inadequate certification process and / or flaws in methodology concerning verification	475				
		of the system / product compliance with requirements - Fire deection system components					
		Flaws in manufacturer quality control process - Fire detection system components	476				
		Flaws in aircraft system maintenance process definition - Fire warning system	477				
		Inadequate certification process and / or flaws in methodology concerning verification	478				
		of the system / product compliance with requirements - Fire warning system					
		Flaws in manufacturer quality control process - Fire warning system	479				
19 E	R11B431	Flaws in pilot requirements definition process and/or training methodology	168	2; 3; 4; 5; 7; 9;	11; 15; 16; 18; 19; 20;	31; 32; 33; 34; 35; 36;	45; 50; 51; 52; 53; 54;
					21; 22;	37; 38; 39; 43; 44	55; 56; 58; 59; 60; 61;
		Pilot tiredness - Inadequate workload distribution	167				62; 63
		Lack of adherence to AFM in terms of emergency procedures - fire detection and	483				
		extinguishing procedure	_				1
		Wildlife incursion Cargo loading unsecured / shift	5 17		-	+	
		Volcanic ash encounter	22				
		Contaminated Runway	39				
긔		Midair collision	66				
		Collision with ground obstacle Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	67 129				
		distribution	129				
		Flaws in vehicle driver / equipment operator / ground agent requirements definition	130				
		process and/or training methodology					
		Flaws in maintenance technician / airworthiness specialist requirements definition	149				
_		process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
		distribution					
		Pilot tiredness - Inadequate workload distribution	167				
-		Flaws in pilot requirements definition process and/or training methodology Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of	168 216				
		contaminations.	210				
		Lack of adherence to SOP in terms of fuelling procedure	218				
		Flaws in aircraft system maintenance process definition - Electrical wiring System	252				
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components	333				
		, , , , , , , , , , , , , , , , , , , ,					
		Flaws in aircraft system maintenance process definition - Hydraulic System	334				
		Inadequate certification process and / or flaws in methodology concerning verification	352				
		of the system / product compliance with requirements - Fuel system components					
		Inadequate maintenance of fire vulnerable aircraft parts or components	353				
		Inadequate certification process and / or flaws in methodology concerning verification	354				
		of the system / product compliance with requirements in terms of fire resistance					
		Lack of adherence to regulations concerning transport of DGR goods	359				
		Separation of structural element / component of the aircraft during take-off or landing	360				
			06:				
		Flaws in aircraft system maintenance process definition - Fuel system compoonents Lack of adherence to engine limitations	361 409		+		
		Inadequate certification process and / or flaws in methodology concerning verification	454				
		of the system / product compliance with requirements - Engine systems and / or	"				
\dashv		components	450		ļ		
\dashv		Flaws in manufacturer quality control process - Engine systems and / or components Flaws in aircraft system maintenance process definition - Engine systems and / or	458 463		1		
		components	703				
		Inadequate certification process and / or flaws in methodology concerning verification	464				
		of the system / product compliance with requirements - APU systems and / or			1		
-		components Flaws in manufacturer quality control process - APU systems and / or components	465		-		
		Flaws in aircraft system maintenance process definition - APU systems and / or	466				
		components					
		Inadequate certification process and / or flaws in methodology concerning verification	467				
		of the system / product compliance with requirements - Electrical / wiring system components					
\dashv		Flaws in manufacturer quality control process - Electrical / wiring systems components	468		 		
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		Flaws in maintenance technician / airworthiness specialist requirements definition	149				
		process and/or training methodology	150		1	1	
		Maintenance technician / aiguerthiness specialist tiredaess. Leaderwater and lead		i de la companya de la companya de la companya de la companya de la companya de la companya de la companya de	1	I	1
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	130				
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the current technology standards in terms of flight safety	220				
		distribution					



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Code	Idont	ifiable precursors	No	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
Code		quate certification process and / or flaws in methodology concerning verification	475	oris. reciliology	Jris. Hullian	3FIS. OIGAINSALION	Organisations
		system / product compliance with requirements - Fire deection system					
		onents					
		in manufacturer quality control process - Fire detection system components	476				
		in aircraft system maintenance process definition - Fire warning system quate certification process and / or flaws in methodology concerning verification	477 478				
		system / product compliance with requirements - Fire warning system	4/6				
		-,,					
		in manufacturer quality control process - Fire warning system	479				
20 ER11B4	432 Pilot t	iredness - Inadequate workload distribution	167	2; 3; 4; 5; 7; 9;	11; 15; 16; 18; 19; 20;	31; 32; 33; 34; 35; 36;	45; 50; 51; 52; 53; 54
					21; 22;	37; 38; 39; 43; 44	55; 56; 58; 59; 60; 63 62; 63
	Flaws	in pilot requirements definition process and/or training methodology	168				02; 03
		fe incursion	5				
	Cargo	loading unsecured / shift	17				
		nic ash encounter	22				
		minated Runway	39				
		r collision	66 67				_
		on with ground obstacle e driver / equipment operator / ground agent tiredness - Inadequate workload	129				
	distrib						
	Flaws	in vehicle driver / equipment operator / ground agent requirements definition	130				
		ss and/or training methodology					1
		in maintenance technician / airworthiness specialist requirements definition	149				
-		ss and/or training methodology enance technician / airworthiness specialist tiredness - Inadequate workload	150				+
	distrib		130				
		iredness - Inadequate workload distribution	167				
	Flaws	in pilot requirements definition process and/or training methodology	168				
	Lack o	f adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of	216				
		minations.					
		if adherence to SOP in terms of fuelling procedure in aircraft system maintenance process definition - Electrical wiring System	218 252				
		quate certification process and / or flaws in methodology concerning verification	333				
		system / product compliance with requirements - Hydraulic system components	333				
		7,					
		in aircraft system maintenance process definition - Hydraulic System	334				
		quate certification process and / or flaws in methodology concerning verification	352				
	of the	system / product compliance with requirements - Fuel system components					
_	Inade	quate maintenance of fire vulnerable aircraft parts or components	353				
		quate certification process and / or flaws in methodology concerning verification	354				
		system / product compliance with requirements in terms of fire resistance					
		f adherence to regulations concerning transport of DGR goods	359				
	Separ	ation of structural element / component of the aircraft during take-off or landing	360				
	Elawe	in aircraft system maintenance process definition - Fuel system compoonents	361				
		of adherence to engine limitations	409				
		quate certification process and / or flaws in methodology concerning verification	454				
	of the	system / product compliance with requirements - Engine systems and / or					
	- P	onents					
		in manufacturer quality control process - Engine systems and / or components	458				
		in aircraft system maintenance process definition - Engine systems and / or	463				
		onents quate certification process and / or flaws in methodology concerning verification	464				+
		system / product compliance with requirements - APU systems and / or					
	comp	onents					
		in manufacturer quality control process - APU systems and / or components	465				
		in aircraft system maintenance process definition - APU systems and / or	466				
-		onents quate certification process and / or flaws in methodology concerning verification	467				+
		system / product compliance with requirements - Electrical / wiring system	40/				
		onents					
	Flaws	in manufacturer quality control process - Electrical / wiring systems components	468				
\perp							1
		in maintenance technician / airworthiness specialist requirements definition	149				
_		ss and/or training methodology enance technician / airworthiness specialist tiredness - Inadequate workload	150				+
	distrib	· · · · · · · · · · · · · · · · · · ·	130				
\neg		f adherence to the current technology standards in terms of flight safety	220				1
		rting systems. Lack of fire detection / warning or / and extinguishing system.					
		in aircraft system maintenance process definition - Fire detection system	474				
-		onents					1
		quate certification process and / or flaws in methodology concerning verification	475				
		system / product compliance with requirements - Fire deection system onents					
+		in manufacturer quality control process - Fire detection system components	476				+
		in aircraft system maintenance process - Fire detection system components	477				
		quate certification process and / or flaws in methodology concerning verification	478				
		system / product compliance with requirements - Fire warning system					
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						SPIs: System of
Code	Identifiable precursors		SPIs: Technology	SPIs: Human	SPIs: Organisation	Organisations
21 ER11B44	Pilot tiredness - Inadequate workload distribution	167	2; 3; 4; 5; 7; 9;	11; 15; 16; 18; 19; 20; 21; 22;	31; 32; 33; 34; 35; 36; 37; 38; 39; 43; 44	45; 50; 51; 52; 53; 5 55; 56; 58; 59; 60; 6 62; 63
	Flaws in pilot requirements definition process and/or training methodology Lack of adherence to AFM in terms of emergency procedures - fire detection and	168 483				
	extinguishing procedure	403				
	Unintuitive and / or error prone system manual - fire extinguishing system	484				
	Wildlife incursion Cargo loading unsecured / shift	5 17				
	Volcanic ash encounter	22				
	Contaminated Runway	39				
	Midair collision	66				
	Collision with ground obstacle Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	67 129				
	distribution	123				
	Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130				
	Flaws in maintenance technician / airworthiness specialist requirements definition	149				
	process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
	distribution	130				
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168				
	Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence o contaminations.	216				
+	Lack of adherence to SOP in terms of fuelling procedure	218				+
	Flaws in aircraft system maintenance process definition - Electrical wiring System	252				
	inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components	333				
+	Flaws in aircraft system maintenance process definition - Hydraulic System	334	-			+
	Inadequate certification process and / or flaws in methodology concerning verification	352				
	of the system / product compliance with requirements - Fuel system components					
	Inadequate maintenance of fire vulnerable aircraft parts or components	353				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements in terms of fire resistance	354				
	Lack of adherence to regulations concerning transport of DGR goods	359				
	Separation of structural element / component of the aircraft during take-off or landing	_				
	Flaws in aircraft system maintenance process definition - Fuel system compoonents Lack of adherence to engine limitations	361 409				
	Inadequate certification process and / or flaws in methodology concerning verification	454				
	of the system / product compliance with requirements - Engine systems and / or components					
	Flaws in manufacturer quality control process - Engine systems and / or components	458				
	Flaws in aircraft system maintenance process definition - Engine systems and / or	463				
	components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or	464				
	components					
	Flaws in manufacturer quality control process - APU systems and / or components Flaws in aircraft system maintenance process definition - APU systems and / or	465 466				
	components Inadequate certification process and / or flaws in methodology concerning verification	467				
	of the system / product compliance with requirements - Electrical / wiring system components Flaws in manufacturer quality control process - Electrical / wiring systems components	468				
	Flaws in manufacturer quality control process - Electrical / wiring systems components Flaws in maintenance technician / airworthiness specialist requirements definition	149				
	process and/or training methodology		<u> </u>		<u> </u>	<u> </u>
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
-	distribution Lack of adherence to the current technology standards in terms of flight safety	220	-			+
	supporting systems. Lack of fire detection / warning or / and extinguishing system.	220				
	Flaws in aircraft system maintenance process definition - Fire detection system	474				
	components	+				1
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components	475				
	Flaws in manufacturer quality control process - Fire detection system components	476				1
	Flaws in aircraft system maintenance process definition - Fire warning system	477				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system	478				
+	Flaws in manufacturer quality control process - Fire warning system	479	+	+		+
22 ER11B45	Inadequate effectivenes of fire extinguishing system	_	2; 3; 4; 5; 7; 9;	11; 15; 16; 18; 19; 20; 21; 22;	31; 32; 33; 34; 35; 36; 37; 38; 39; 43; 44	45; 50; 51; 52; 53; 55; 56; 58; 59; 60;
	Inadequate certification process and / or flaws in methodology concerning verification	480				62; 63
1	of the system / product compliance with requirements - Fire extinguishing system components					



						SPIs: System of
Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	Organisations
	Flaws in manufacturer quality control process - Fire extinguishing system components	482				
	Flaws in maintenance technician / airworthiness specialist requirements definition	149				
	process and/or training methodology					
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
	distribution					
	Wildlife incursion	5				
	Cargo loading unsecured / shift	17				
	Volcanic ash encounter	22				
	Contaminated Runway	39				
	Midair collision	66				
	Collision with ground obstacle	67				
	Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	129				
	distribution					
	Flaws in vehicle driver / equipment operator / ground agent requirements definition	130				
	process and/or training methodology					
	Flaws in maintenance technician / airworthiness specialist requirements definition	149				
	process and/or training methodology					



Code	le	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
31 Code	e	identifiable precursors	No.	Technology	Human	Organisation	System of
		At an O and a state of the stat					Organisations
1 ER31	1F53	Aircraft are positioned on collision course Flaws in Airspace and Air Traffic planning procedures design process	323		19;	32; 33; 34; 35;	47; 50; 51; 52; 53; 56
1 2.1.51	1.55	Trains in Amspace and Amstraline planning procedures design process	525		13,	32, 33, 31, 33,	57; 59; 60; 61; 62; 63
2 ER31	1B10	Flaws in Airspace and Air Traffic planning procedures design process	323		19;	32; 33; 34; 35;	47; 50; 51; 52; 53; 56
-		Inadequate coordination between ATM centers and/or ATC sectors	321				57; 59; 60; 61; 62; 63
+		Flaws in conflict and separation minima infringement detection / elimination	326				
		procedures					
3 ER31	1B91	Flaws in conflict and separation minima infringement detection / elimination	326		19;	32; 33; 34; 35;	47; 50; 51; 52; 53; 56
$+\!-$		procedures Tactical or / and Planning Controller tiredness - Inadequate workload distribution	300				57; 59; 60; 61; 62; 63
+		Flaws in Tactical or / and Planning Controller requirements definition process and/or	301				
		training methodology					
4 ER31	1B9211	Flaws in Airspace and Air Traffic planning procedures design process	323		19;	32; 33; 34; 35;	47; 50; 51; 52; 53; 56
5 FR31	1B9212	Inadequate coordination between ATM centers and/or ATC sectors	321		19;	32; 33; 34; 35;	57; 59; 60; 61; 62; 63 47; 50; 51; 52; 53; 56
5 2.1.52	10,212	madequate coordination between tim centers and/or the sectors	521		13,	32, 33, 31, 33,	57; 59; 60; 61; 62; 63
		Lack of adherence of airlines to time contraints and deadlines in terms of providing the	327				
—		Network Manager Operation Centre with obligatory data.	222				
6 ER31	1B922	Flaws in Airspace and Air Traffic planning procedures design process Tactical or / and Planning Controller tiredness - Inadequate workload distribution	323 300		19;	32; 33; 34; 35;	47; 50; 51; 52; 53; 5
O LINSI	10322	Tactical of 7 and Flamming controller theatiess intacquate workload distribution	300		13,	32, 33, 34, 33,	57; 59; 60; 61; 62; 63
		Flaws in Tactical or / and Planning Controller requirements definition process and/or	301				
+		training methodology	200				1
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MTCD System	328				
7 ER31	1B923	Tactical or / and Planning Controller tiredness - Inadequate workload distribution	300		19;	32; 33; 34; 35;	47; 50; 51; 52; 53; 5
						, , , , , , , , , , , , , , , , , , , ,	57; 59; 60; 61; 62; 63
		Flaws in Tactical or / and Planning Controller requirements definition process and/or	301				
8 ER31	1002	training methodology Tactical or / and Planning Controller tiredness - Inadequate workload distribution	300		19;	32; 33; 34; 35;	47; 50; 51; 52; 53; 50
9 EV31	1033	Tactical of 7 and Planning Controller theuness - inadequate workload distribution	300		19,	32, 33, 34, 33,	57; 59; 60; 61; 62; 6
\neg		Flaws in Tactical or / and Planning Controller requirements definition process and/or	301				. , . , . , . , . , . , .
		training methodology					
—		Inadequate coordination between ATM centers and/or ATC sectors	321 323				
9 ER31	1B94	Flaws in Airspace and Air Traffic planning procedures design process Tactical or / and Planning Controller tiredness - Inadequate workload distribution	300		19;	32; 33; 34; 35;	47; 50; 51; 52; 53; 5
5 2.1.52	1051	Tactical of 7 and 1 annuing controller theatess inducedance workload distribution	300		13,	32, 33, 31, 33,	57; 59; 60; 61; 62; 63
		Flaws in Tactical or / and Planning Controller requirements definition process and/or	301				
		training methodology					
10 ER31	105111	Inadequate coordination between ATM centers and/or ATC sectors Flaws in Airspace and Air Traffic planning procedures design process	321 323		19;	32; 33; 34; 35;	47; 50; 51; 52; 53; 56
10 11131	103111	Traws in Airspace and Air Traine planning procedures design process	323		13,	32, 33, 34, 33,	57; 59; 60; 61; 62; 63
		Lack of adherence of airlines to time contraints and deadlines in terms of providing the	327				
		Network Manager Operation Centre with obligatory data.					47 50 54 52 52 5
11 ER31	185112	Tactical or / and Planning Controller tiredness - Inadequate workload distribution	300		19;	32; 33; 34; 35;	47; 50; 51; 52; 53; 56 57; 59; 60; 61; 62; 63
+		Flaws in Tactical or / and Planning Controller requirements definition process and/or	301				37, 33, 66, 61, 62, 6.
		training methodology					
-		Failure to identify the pre-tactical conflict before it reach the tactical controller	330				
$+\!-$		Lack of adherence of airlines to declared Flight Plan. Lack of adherence of airlines to time contraints and deadlines in terms of providing the	329 327				
		Network Manager Operation Centre with obligatory data.	327				
12 ER31	1B512	Tactical or / and Planning Controller tiredness - Inadequate workload distribution	300		19;	32; 33; 34; 35;	47; 50; 51; 52; 53; 5
—							57; 59; 60; 61; 62; 6
		Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology	301				
12 500		training methodology	300		19;	32; 33; 34; 35;	47; 50; 51; 52; 53; 50
13 ER31	1B513	Tactical or / and Planning Controller tiredness - Inadequate workload distribution	300				
13 ER31	1B513	Tactical or / and Planning Controller tiredness - Inadequate workload distribution	300		19,		57; 59; 60; 61; 62; 6
13 ER31	18513	Flaws in Tactical or / and Planning Controller requirements definition process and/or	301		15,		57; 59; 60; 61; 62; 6
13 ER31	18513	Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology	301		15,		57; 59; 60; 61; 62; 6
		Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology Lack of adherence to SOP for Airborne operation in terms of minimum seprataion	301 331			32: 33: 34: 35:	
13 ER31		Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology	301		19;	32; 33; 34; 35;	47; 50; 51; 52; 53; 50
		Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology Lack of adherence to SOP for Airborne operation in terms of minimum seprataion Tactical or / and Planning Controller tiredness - Inadequate workload distribution Flaws in Tactical or / and Planning Controller requirements definition process and/or	301 331			32; 33; 34; 35;	47; 50; 51; 52; 53; 5
		Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology Lack of adherence to SOP for Airborne operation in terms of minimum seprataion Tactical or / and Planning Controller tiredness - Inadequate workload distribution Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology	301 331 300 301			32; 33; 34; 35;	47; 50; 51; 52; 53; 5
14 ER31	18514	Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology Lack of adherence to SOP for Airborne operation in terms of minimum seprataion Tactical or / and Planning Controller tiredness - Inadequate workload distribution Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology Inadequate coordination between ATM centers and/or ATC sectors	301 331 300 301 321		19;		47; 50; 51; 52; 53; 5 57; 59; 60; 61; 62; 6
	18514	Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology Lack of adherence to SOP for Airborne operation in terms of minimum seprataion Tactical or / and Planning Controller tiredness - Inadequate workload distribution Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology	301 331 300 301			32; 33; 34; 35; 32; 33; 34; 35;	47; 50; 51; 52; 53; 5 57; 59; 60; 61; 62; 6 47; 50; 51; 52; 53; 5
14 ER31	18514	Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology Lack of adherence to SOP for Airborne operation in terms of minimum seprataion Tactical or / and Planning Controller tiredness - Inadequate workload distribution Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology Inadequate coordination between ATM centers and/or ATC sectors Lack of English proficiency Incorrect or confusing / misleading ATC instructions	301 331 300 301 321 132		19;		47; 50; 51; 52; 53; 5 57; 59; 60; 61; 62; 6 47; 50; 51; 52; 53; 5
14 ER31	18514	Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology Lack of adherence to SOP for Airborne operation in terms of minimum seprataion Tactical or / and Planning Controller tiredness - Inadequate workload distribution Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology Inadequate coordination between ATM centers and/or ATC sectors Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller	301 331 300 301 321 132 133 134		19;		47; 50; 51; 52; 53; 5 57; 59; 60; 61; 62; 6 47; 50; 51; 52; 53; 5
14 ER31	18514	Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology Lack of adherence to SOP for Airborne operation in terms of minimum seprataion Tactical or / and Planning Controller tiredness - Inadequate workload distribution Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology Inadequate coordination between ATM centers and/or ATC sectors Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution	301 331 300 301 321 132 133 134 137		19;		47; 50; 51; 52; 53; 5 57; 59; 60; 61; 62; 6 47; 50; 51; 52; 53; 5
14 ER31	18514	Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology Lack of adherence to SOP for Airborne operation in terms of minimum seprataion Tactical or / and Planning Controller tiredness - Inadequate workload distribution Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology Inadequate coordination between ATM centers and/or ATC sectors Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller	301 331 300 301 321 132 133 134 137		19;		47; 50; 51; 52; 53; 5 57; 59; 60; 61; 62; 6 47; 50; 51; 52; 53; 5
14 ER31	18514	Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology Lack of adherence to SOP for Airborne operation in terms of minimum seprataion Tactical or / and Planning Controller tiredness - Inadequate workload distribution Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology Inadequate coordination between ATM centers and/or ATC sectors Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution	301 331 300 301 321 132 133 134 137		19;		47; 50; 51; 52; 53; 5 57; 59; 60; 61; 62; 6 47; 50; 51; 52; 53; 5
14 ER31	18514	Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology Lack of adherence to SOP for Airborne operation in terms of minimum seprataion Tactical or / and Planning Controller tiredness - Inadequate workload distribution Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology Inadequate coordination between ATM centers and/or ATC sectors Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	301 331 300 301 321 132 133 134 137 145		19;		47; 50; 51; 52; 53; 51; 57; 59; 60; 61; 62; 6: 47; 50; 51; 52; 53; 51
14 ER31	18514	Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology Lack of adherence to SOP for Airborne operation in terms of minimum seprataion Tactical or / and Planning Controller tiredness - Inadequate workload distribution Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology Inadequate coordination between ATM centers and/or ATC sectors Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	301 331 300 301 321 132 133 134 137 145 146 148		19; 19; 20;	32; 33; 34; 35;	47; 50; 51; 52; 53; 56; 57; 59; 60; 61; 62; 63; 47; 50; 51; 52; 53; 56; 57; 59; 60; 61; 62; 63; 57; 59; 60; 61; 62; 63; 57; 59; 60; 61; 62; 63; 63; 64; 64; 64; 64; 64; 64; 64; 64; 64; 64
14 ER31	18514	Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology Lack of adherence to SOP for Airborne operation in terms of minimum seprataion Tactical or / and Planning Controller tiredness - Inadequate workload distribution Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology Inadequate coordination between ATM centers and/or ATC sectors Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	301 331 300 301 321 132 133 134 137 145		19;		47; 50; 51; 52; 53; 56; 57; 59; 60; 61; 62; 63; 47; 50; 51; 52; 53; 56; 57; 59; 60; 61; 62; 63; 63; 64; 62; 63; 64; 62; 63; 64; 64; 64; 64; 64; 64; 64; 64; 64; 64
14 ER31	18514	Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology Lack of adherence to SOP for Airborne operation in terms of minimum seprataion Tactical or / and Planning Controller tiredness - Inadequate workload distribution Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology Inadequate coordination between ATM centers and/or ATC sectors Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	301 331 300 301 321 132 133 134 137 145 146 148		19; 19; 20;	32; 33; 34; 35;	57; 59; 60; 61; 62; 63 47; 50; 51; 52; 53; 56; 57; 59; 60; 61; 62; 63 47; 50; 51; 52; 53; 56; 57; 59; 60; 61; 62; 63 47; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63



SPIs: System of Identifiable precursors Code No. SPIs: Technology SPIs: Human **SPIs: Organisation** Organisations Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle 148 driver Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Unintuitive and / or error prone system manual - communication equipment 305 336 Incorrect use of communication equipment 17 FR31B523 Lack of English proficiency 132 19: 20: 21: 31; 32; 33; 34; 35; 47; 50; 51; 56; 57; 59; 60; 61; 62; 63 Incorrect or confusing / misleading ATC instructions 133 Use of non-standard phraseology by pilot and/or controller 134 137 Traffic controller tiredness - Inadequate workload distribution laws in traffic controller requirements definition process and/or training methodology 145 Lack of or poor communication quality 146 Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle 148 driver Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 169 Hearback ommitted 47; 50; 51; 59; 60; 61; 18 ER31B53 Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 19; 20; 21; 31; 32; 33; 34; 35; 151 62; 63 or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Lack of adherence to Rules of the Air - adherence to Controller clearance 296 315 Failure to comply with an altitude or speed restriction / constraint 19 ER31F6111 47; 50; 51; 56; 57; 58; Military activity in controlled airport or located within controlled area 339 19; 20; 21; 31; 32; 33; 34; 35; 59: 60: 61: 62: 63 20 FR31F6112 47: 50: 51: 56: 57: 58: General aviation activity in controlled airport or located within controlled area 340 19: 20: 21: 31: 32: 33: 34: 35: 59; 60; 61; 62; 63 21 ER31F61211 31; 32; 33; 34; 35; 47; 50; 51; 56; 57; 59; Lack of English proficiency 132 19; 20; 21; 60; 61; 62; 63 Incorrect or confusing / misleading ATC instructions 133 Use of non-standard phraseology by pilot and/or controller 134 Traffic controller tiredness - Inadequate workload distribution 137 Flaws in traffic controller requirements definition process and/or training methodology 145 Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle 148 22 FR31F61212 Lack of English proficiency 132 19: 20: 21: 31-32-33-34-35-47: 50: 51: 56: 57: 58: 59; 60; 61; 62; 63 Incorrect or confusing / misleading ATC instructions 133 Use of non-standard phraseology by pilot and/or controller 134 Traffic controller tiredness - Inadequate workload distribution 137 Flaws in traffic controller requirements definition process and/or training methodology 145 Lack of or poor communication quality 146 Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle 148 driver Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Hearback ommitted 169 47; 56; 57; 59; 60; 61; 23 ER31F6122 Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 19; 20; 21; 31; 32; 33; 34; 35; or / and passive contribution to the PF duties 62; 63 Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology 168 Lack of adherence to Rules of the Air - adherence to Controller clearance 296 47; 50; 51; 54; 55; 58; 24 ER31F6123 27; 31; 32; 33; 34; 35; Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 19; 20; 21; 25 or / and passive contribution to the PF duties 59; 60; 61; 62; 63 39; Pilot tiredness - Inadequate workload distribution 167 168 Flaws in pilot requirements definition process and/or training methodology Altimeter setting error 274 Lack of adherence to SOP for take-off procedure in terms of altimeter callibration 294 25 ER31F6124 19; 20; 21; 47; 50; 51; 54; 55; 56; 31; 32; 33; 34; 35; System failure affecting the operation of primary instruments / displays or standby 26 1: 3: 57; 58; 59; 60; 61; 62; Flaws in maintenance technician / airworthiness specialist requirements definition 149 process and/or training methodology 150 Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification 299 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) Flaws in manufacturer quality control process - FMS subsystem and components 306 (autopilot incl.) Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.) Flaws in aircraft system maintenance process definition - Onboard navigational systems 491 and components Inadequate certification process and / or flaws in methodology concerning verification 492 of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and 493



Cod	de	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
26 ER31	1F6125	Airspace infringement	71		19; 20; 21;	31; 32; 33; 34; 35;	47; 50; 51; 56; 57; 59; 60; 61; 62; 63
		Traffic controller tiredness - Inadequate workload distribution	137				00, 01, 02, 03
		Flaws in traffic controller requirements definition process and/or training methodology	_				
_		Pilot tiredness - Inadequate workload distribution	167 168				
		Flaws in pilot requirements definition process and/or training methodology Altitude deviation	312				
		Level bust (pilot lapse or late re-clearance by ATC)	313				
		Deviation from flight trajectory commanded by controller	343				
27 ER31	1F6126	Convective weather encounter	18		19; 20; 21;	31; 32; 33; 34; 35;	47; 48; 50; 51; 54; 55
							56; 57; 58; 59; 60; 61 62; 63
28 ER31		Convective weather encounter in traffic intensive airport proximity	76		19; 21;	31; 32; 33; 34; 35;	47; 48; 50; 51; 56; 57 58; 59; 60; 61; 62; 63
29 ER31	31B611	Airspace infringement	71		19; 20;	32; 33; 34; 35;	47; 50; 51; 54; 55; 56 57; 58; 59; 60; 61; 62 63
		System failure affecting the operation of primary instruments / displays or standby	78				
20 5021	110012	instruments - ADS-B System	71		10, 20, 21,	24, 22, 22, 24, 25,	47, 50, 51, 50, 57, 50
30 ER31	118612	Airspace infringement	/1		19; 20; 21;	31; 32; 33; 34; 35;	47; 50; 51; 56; 57; 59 60; 61; 62; 63
		Traffic controller tiredness - Inadequate workload distribution	137				00,00,00
			145				
		Altitude deviation	312				
-+		Level bust (pilot lapse or late re-clearance by ATC) Navigation deviation	313 317				
		Deviation from flight trajectory commanded by controller	343				
31 ER31	1B621	Lack of English proficiency	132		19; 20; 21;	31; 32; 33; 34; 35;	47; 50; 51; 56; 57; 59
		<u> </u>				, - ,,	60; 61; 62; 63
		Incorrect or confusing / misleading ATC instructions	133				
		Use of non-standard phraseology by pilot and/or controller	134				
		Traffic controller tiredness - Inadequate workload distribution	137				
		Flaws in traffic controller requirements definition process and/or training methodology	145				
		Lack of or poor communication quality	146				
32 ER31	1B622	Prolonged loss of communication (PLOC) between pilot and controller	73		19; 20; 21;	31; 32; 33; 34; 35;	47; 50; 51; 54; 55; 56 57; 58; 59; 60; 61; 62 63
		Traffic controller tiredness - Inadequate workload distribution	137				
		Flaws in traffic controller requirements definition process and/or training methodology	145				
		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	148				
		driver Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
		or / and passive contribution to the PF duties	131				
		Pilot tiredness - Inadequate workload distribution	167				
		Flaws in pilot requirements definition process and/or training methodology	168				
		Flaws in aircraft system maintenance process definition - Communication equipment	270				
		systems and components.	274				
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment	271				
		systems and components.					
		Flaws in manufacturer quality control process - Communication equipment systems	272				
		and components.					
		Unintuitive and / or error prone system manual - communication equipment.	305				
0.11	1005	Incorrect use of communication equipment	336		10.05.51	24.07.77	47.50.51.55.55
33 ER31	s1B623	Lack of English proficiency	132		19; 20; 21;	31; 32; 33; 34; 35;	47; 50; 51; 56; 57; 59 60; 61; 62; 63
-		Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller	133 134		+		
_			134		+		+
			145				
-		Lack of or poor communication quality	146				
		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	148				
-		driver					
		Pilot tiredness - Inadequate workload distribution	167				
-		Flaws in pilot requirements definition process and/or training methodology Hearback ommitted	168 169			+	
34 ER31	1B63	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151		19; 20; 21;	31; 32; 33; 34; 35;	47; 50; 51; 56; 57; 59
		or / and passive contribution to the PF duties					60; 61; 62; 63
		Pilot tiredness - Inadequate workload distribution	167				
		Flaws in pilot requirements definition process and/or training methodology	168				
		Lack of adherence to Rules of the Air - adherence to Controller clearance	296				
35 ER31	31F71	Traffic controller tiredness - Inadequate workload distribution	137		19; 20; 21;	31; 32; 33; 34; 35;	47; 50; 51; 56; 57; 59
		Flaws in traffic controller requirements definition process and/or training methodology	145				60; 61; 62; 63
		naws in traine controller requirements definition process and/or training methodology	143				
				1	1		
36 ER31	187	Traffic controller tiredness - Inadequate workload distribution	137		19; 20; 21;	31; 32; 33; 34; 35;	47; 50; 51; 56; 57; 59
36 ER31	1187	Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology			19; 20; 21;	31; 32; 33; 34; 35;	47; 50; 51; 56; 57; 59 60; 61; 62; 63



	Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
		Flaws in conflict and separation minima infringement detection / elimination	326				
37	ER31F81	procedures Intensified traffic related to general aviation activity e. g. over GA airport / airfield	342		18; 19; 20; 21;	31; 32; 33; 34; 35;	47; 50; 51; 56; 57; 59;
38	ER31B81	Traffic controller tiredness - Inadequate workload distribution	137		19; 20; 21;	31; 32; 33; 34; 35;	60; 61; 62; 63 47; 50; 51; 56; 57; 59;
		Flaws in traffic controller requirements definition process and/or training methodology	145				60; 61; 62; 63
\dashv		Flaws in Airspace and Air Traffic planning procedures design process	323				
39	ER31B821	Flaws in Airspace and Air Traffic planning procedures design process	323		19; 20; 21;	31; 32; 33; 34; 35;	47; 50; 51; 56; 57; 59 60; 61; 62; 63
40	ER31B822	Prolonged loss of communication (PLOC) between pilot and controller	73		19; 20; 21;	31; 32; 33; 34; 35;	47; 50; 51; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
		Traffic controller tiredness - Inadequate workload distribution	137				
		Flaws in traffic controller requirements definition process and/or training methodology	145				
		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	148				
		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151				
		Pilot tiredness - Inadequate workload distribution	167				
		Flaws in pilot requirements definition process and/or training methodology	168				
		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.	270				
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment	271				
		systems and components. Flaws in manufacturer quality control process - Communication equipment systems	272				
_		and components. Unintuitive and / or error prone system manual - communication equipment.	305		+		
		Incorrect use of communication equipment	336				
41	ER31B823	Lack of English proficiency	132		19; 20; 21;	31; 32; 33; 34; 35;	47; 50; 51; 56; 57; 59 60; 61; 62; 63
		Incorrect or confusing / misleading ATC instructions	133				
\dashv		Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution	134 137				
			145				
		Lack of or poor communication quality	146				
		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	148				
		Pilot tiredness - Inadequate workload distribution	167				
		Flaws in pilot requirements definition process and/or training methodology Hearback ommitted	168 169				
42	ER31B83	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151		19; 20; 21;	31; 32; 33; 34; 35;	47; 50; 51; 56; 57; 59 60; 61; 62; 63
		Pilot tiredness - Inadequate workload distribution	167 168				
\dashv		Flaws in pilot requirements definition process and/or training methodology Lack of adherence to Rules of the Air - adherence to Controller clearance	296				
43	ER31C4	Other cases of loss of separation	72		19; 20; 21;	31; 32; 33; 34; 35;	47; 50; 51; 56; 57; 59 60; 61; 62; 63
		Altitude deviation	312				
_		Level bust (pilot lapse or late re-clearance by ATC) Failure to comply with an altitude or speed restriction / constraint	313 315				
		Navigation deviation	317				
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ADI system components	320				
11	ED21D21	ATC fails to detect and resolve the conflict	244	1. 2.	19: 10: 20: 21: 25	27. 21. 22. 22. 24. 25	47; 48; 50; 51; 52; 53
44	ER31B31	Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of STCA System.	344	1; 3;	18; 19; 20; 21; 25	27; 31; 32; 33; 34; 35; 39;	54; 55; 56; 57; 58; 59 60; 61; 62; 63
		System failure affecting the operation of primary instruments / displays or standby instruments	26				
\Box		Airspace infringement	71				
_		Other cases of loss of separation Prolonged loss of communication (PLOC) between pilot and controller	72 73				
		Convective weather encounter in traffic intensive airport proximity	76				
		System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System	78				
\Box		Lack of English proficiency	132				
\dashv		Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller	133 134		+	+	
		Traffic controller tiredness - Inadequate workload distribution	137				
		Flaws in traffic controller requirements definition process and/or training methodology	-				
_		Lack of or poor communication quality	146				
			148	1	1		
		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver					
		driver Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151				
		driver Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring					



SPIs: System of Code Identifiable precursors No. SPIs: Technology SPIs: Human **SPIs: Organisation** Organisations Flaws in aircraft system maintenance process definition - Communication equipment 270 systems and components. Inadequate certification process and / or flaws in methodology concerning verification 271 of the system / product compliance with requirements - Communication equipment systems and components. Flaws in manufacturer quality control process - Communication equipment systems 272 and components. Altimeter setting error 274 Lack of adherence to SOP for take-off procedure in terms of altimeter callibration 294 Lack of adherence to Rules of the Air - adherence to Controller clearance 296 Inadequate certification process and / or flaws in methodology concerning verification 299 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) Tactical or / and Planning Controller tiredness - Inadequate workload distribution 300 Flaws in Tactical or / and Planning Controller requirements definition process and/or 301 training methodology Unintuitive and / or error prone system manual - communication equipment. Flaws in manufacturer quality control process - FMS subsystem and components 306 autopilot incl.) Altitude deviation 312 Level bust (pilot lapse or late re-clearance by ATC) 313 Failure to comply with an altitude or speed restriction / constraint 315 Navigation deviation nadequate coordination between ATM centers and/or ATC sectors 321 Flaws in Airspace and Air Traffic planning procedures design proces 323 Flaws in conflict and separation minima infringement detection / elimination 326 procedures Lack of adherence of airlines to time contraints and deadlines in terms of providing the 327 Network Manager Operation Centre with obligatory data. Inadequate certification process and / or flaws in methodology concerning verification 328 of the system / product compliance with requirements - MTCD System 329 Lack of adherence of airlines to declared Flight Plan. Failure to identify the pre-tactical conflict before it reach the tactical controller 330 Lack of adherence to SOP for Airborne operation in terms of minimum seprataion 331 ncorrect use of communication equipment 336 Military activity in controlled airport or located within controlled area 339 General aviation activity in controlled airport or located within controlled area 340 342 Intensified traffic related to general aviation activity e.g. over GA airport / airfield Deviation from flight trajectory commanded by controller 343 Flaws in aircraft system maintenance process definition - FMS subsystems and 410 components (autopilot incl.) Flaws in aircraft system maintenance process definition - Onboard navigational systems 491 and components Flaws in manufacturer quality control process - Fire extinguishing system components 482 Flaws in manufacturer quality control process - Onboard navigational systems and 493 components. 47; 48; 50; 51; 52; 53; 45 ER31B32 Inadequate certification process and / or flaws in methodology concerning verification 351 1; 3; 18; 19; 20; 21; 25 27; 31; 32; 33; 34; 35; 54; 55; 56; 57; 58; 59; of the system / product compliance with requirements - STCA System 39; 60; 61; 62; 63 System failure affecting the operation of primary instruments / displays or standby 26 instruments Airspace infringement Other cases of loss of separation Prolonged loss of communication (PLOC) between pilot and controller 73 Convective weather encounter in traffic intensive airport proximity System failure affecting the operation of primary instruments / displays or standby 78 instruments - ADS-B System Lack of English proficiency 132 Incorrect or confusing / misleading ATC instructions 133 Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution 137 Flaws in traffic controller requirements definition process and/or training methodology 145 Lack of or poor communication quality 146 Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle 148 Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties 167 Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology 168 Hearback ommitted Flaws in aircraft system maintenance process definition - Communication equipment 270 systems and components. nadequate certification process and / or flaws in methodology concerning verification 271 of the system / product compliance with requirements - Communication equipment systems and components. Flaws in manufacturer quality control process - Communication equipment systems 272 and components. 274 Altimeter setting error Lack of adherence to SOP for take-off procedure in terms of altimeter callibration 294 Lack of adherence to Rules of the Air - adherence to Controller clearance 296 nadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and omponents (autopilot incl.)



SPIs: System of

Codo	Idoubifiable measurease	N.a	CDIs. Tooknology	CDIs. Human	CDIs: Organisation	SPIs: System of
Code	Identifiable precursors Tactical or / and Planning Controller tiredness - Inadequate workload distribution	300	SPIs: Technology	SPIs: Human	SPIs: Organisation	Organisations
	Flaws in Tactical or / and Planning Controller frequirements definition process and/or	301				
	training methodology	301				
	Unintuitive and / or error prone system manual - communication equipment.	305				
	Flaws in manufacturer quality control process - FMS subsystem and components	306				
	(autopilot incl.)					
	Altitude deviation	312				
	Level bust (pilot lapse or late re-clearance by ATC)	313				
	Failure to comply with an altitude or speed restriction / constraint	315				
	Navigation deviation	317				
	Inadequate coordination between ATM centers and/or ATC sectors	321				
	Flaws in Airspace and Air Traffic planning procedures design process	323				
	Flaws in conflict and separation minima infringement detection / elimination	326				
	procedures					
	Lack of adherence of airlines to time contraints and deadlines in terms of providing the	327				
	Network Manager Operation Centre with obligatory data.	220				
	Inadequate certification process and / or flaws in methodology concerning verification	328				
	of the system / product compliance with requirements - MTCD System Lack of adherence of airlines to declared Flight Plan.	329				
	Failure to identify the pre-tactical conflict before it reach the tactical controller	330				
	Lack of adherence to SOP for Airborne operation in terms of minimum seprataion	331				
	Incorrect use of communication equipment	336				
	Military activity in controlled airport or located within controlled area	339				
	General aviation activity in controlled airport or located within controlled area	340				
	Intensified traffic related to general aviation activity e. g. over GA airport / airfield	342	1	1	1	
	Deviation from flight trajectory commanded by controller	343				
	Flaws in aircraft system maintenance process definition - FMS subsystems and	410				
	components (autopilot incl.)	L	<u> </u>	<u> </u>	<u> </u>	
	Flaws in aircraft system maintenance process definition - Onboard navigational system:	491				
	and components	L				<u> </u>
	Flaws in manufacturer quality control process - Fire extinguishing system components	482				
	Flaws in manufacturer quality control process - Onboard navigational systems and	493				
	components.					
46 ER31B33	Traffic controller tiredness - Inadequate workload distribution	137	1; 3;	18; 19; 20; 21; 25	27; 31; 32; 33; 34; 35; 39;	47; 48; 50; 51; 52; 53 54; 55; 56; 57; 58; 59
						60; 61; 62; 63
	Flaws in traffic controller requirements definition process and/or training methodology	145				
	System failure affecting the operation of primary instruments / displays or standby	26				
	instruments					
	Airspace infringement	71				
	Other cases of loss of separation	72			_	
	Prolonged loss of communication (PLOC) between pilot and controller	73			_	
	Convective weather encounter in traffic intensive airport proximity	76 78				
	System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System	/8				
	Lack of English proficiency	132				
	Incorrect or confusing / misleading ATC instructions	133				
	Use of non-standard phraseology by pilot and/or controller	134				+
	Traffic controller tiredness - Inadequate workload distribution	137				
	Flaws in traffic controller requirements definition process and/or training methodology	_				
	,					
	Lack of or poor communication quality	146				
	Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	148				
	driver					
	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
	or / and passive contribution to the PF duties					
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168				
	Hearback ommitted	169				
	Flaws in aircraft system maintenance process definition - Communication equipment	270				
	systems and components.	1		1		
	Inadequate certification process and / or flaws in methodology concerning verification	271				
	of the system / product compliance with requirements - Communication equipment	1				
	systems and components.	2=-	-	1	+	
	Flaws in manufacturer quality control process - Communication equipment systems	272				
	and components.	2=:	-		+	
	Altimeter setting error Lack of adherence to SOP for take-off procedure in terms of altimeter callibration.	274	-	+	+	
	·	294	-	+	+	
1		296 299	-		+	
	Lack of adherence to Rules of the Air - adherence to Controller clearance	1299	I			
	Inadequate certification process and / or flaws in methodology concerning verification					
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and					
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)					
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) Tactical or / and Planning Controller tiredness - Inadequate workload distribution	300				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) Tactical or / and Planning Controller tiredness - Inadequate workload distribution Flaws in Tactical or / and Planning Controller requirements definition process and/or					
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) Tactical or / and Planning Controller tiredness - Inadequate workload distribution Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology	300 301				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) Tactical or / and Planning Controller tiredness - Inadequate workload distribution Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology Unintuitive and / or error prone system manual - communication equipment.	300 301 305				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) Tactical or / and Planning Controller tiredness - Inadequate workload distribution Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology Unintuitive and / or error prone system manual - communication equipment. Flaws in manufacturer quality control process - FMS subsystem and components	300 301				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) Tactical or / and Planning Controller tiredness - Inadequate workload distribution Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology Unintuitive and / or error prone system manual - communication equipment. Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)	300 301 305 306				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) Tactical or / and Planning Controller tiredness - Inadequate workload distribution Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology Unintuitive and / or error prone system manual - communication equipment. Flaws in manufacturer quality control process - FMS subsystem and components	300 301 305				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) Tactical or / and Planning Controller tiredness - Inadequate workload distribution Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology Unintuitive and / or error prone system manual - communication equipment. Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.) Altitude deviation	300 301 305 306				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) Tactical or / and Planning Controller tiredness - Inadequate workload distribution Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology Unintuitive and / or error prone system manual - communication equipment. Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.) Altitude deviation Level bust (pilot lapse or late re-clearance by ATC)	300 301 305 306 312 313				



	Code	Identifiable precursors	No	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	Coue	Flaws in Airspace and Air Traffic planning procedures design process	323	Jr 13. Technology	Jris. Hullian	Jr 13. Organisacion	Organisations
		Flaws in conflict and separation minima infringement detection / elimination	326				
		procedures					
		Lack of adherence of airlines to time contraints and deadlines in terms of providing the	327				
		Network Manager Operation Centre with obligatory data.	220				
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MTCD System	328				
		Lack of adherence of airlines to declared Flight Plan.	329				
		Failure to identify the pre-tactical conflict before it reach the tactical controller	330				
		Lack of adherence to SOP for Airborne operation in terms of minimum seprataion	331				
		Incorrect use of communication equipment	336				
		Military activity in controlled airport or located within controlled area	339				
		General aviation activity in controlled airport or located within controlled area Intensified traffic related to general aviation activity e. g. over GA airport / airfield	340 342				
		Deviation from flight trajectory commanded by controller	343				
		Flaws in aircraft system maintenance process definition - FMS subsystems and	410				
		components (autopilot incl.)					
		Flaws in aircraft system maintenance process definition - Onboard navigational systems	491				
		and components					
		Flaws in manufacturer quality control process - Fire extinguishing system components	482				
		Flaws in manufacturer quality control process - Onboard navigational systems and	493				
		components.	495				
47	7 ER31B34	Traffic controller tiredness - Inadequate workload distribution	137	1; 3;	18; 19; 20; 21; 25	27; 31; 32; 33; 34; 35; 39;	47; 48; 50; 51; 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
		Flaws in traffic controller requirements definition process and/or training methodology	145				00, 01, 02, 03
			Ĺ	<u> </u>	<u> </u>	<u> </u>	<u> </u>
		System failure affecting the operation of primary instruments / displays or standby	26				
		instruments		ļ		1	ļ
		Airspace infringement	71	-	1	-	-
		Other cases of loss of separation Prolonged loss of communication (PLOC) between pilot and controller	72 73				
		Convective weather encounter in traffic intensive airport proximity	76				
		System failure affecting the operation of primary instruments / displays or standby	78				
		instruments - ADS-B System					
		Lack of English proficiency	132				
		Incorrect or confusing / misleading ATC instructions	133				
		Use of non-standard phraseology by pilot and/or controller	134				
		Traffic controller tiredness - Inadequate workload distribution	137				
		Flaws in traffic controller requirements definition process and/or training methodology	145				
		Lack of or poor communication quality	146				
		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	148				
		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
		or / and passive contribution to the PF duties					
		Pilot tiredness - Inadequate workload distribution	167				
		Flaws in pilot requirements definition process and/or training methodology Hearback ommitted	168 169				
		Flaws in aircraft system maintenance process definition - Communication equipment	270				
		systems and components.					
		Inadequate certification process and / or flaws in methodology concerning verification	271				
		of the system / product compliance with requirements - Communication equipment					
		systems and components.					
		Flaws in manufacturer quality control process - Communication equipment systems and components.	272				
		Altimeter setting error	274				
		Lack of adherence to SOP for take-off procedure in terms of altimeter callibration.	294			+	
		Lack of adherence to Rules of the Air - adherence to Controller clearance	296				
		Inadequate certification process and / or flaws in methodology concerning verification	299				
		of the system / product compliance with requirements - FMS subsystems and					
	+	components (autopilot incl.) Tactical or / and Planning Controller tiredness - Inadequate workload distribution	300	+		+	+
		Flaws in Tactical or / and Planning Controller tredness - Inadequate workload distribution Flaws in Tactical or / and Planning Controller requirements definition process and/or	301	<u> </u>		+	
		training methodology			1	1	
		training methodology Unintuitive and / or error prone system manual - communication equipment.	305		<u> </u>		
		Unintuitive and / or error prone system manual - communication equipment. Flaws in manufacturer quality control process - FMS subsystem and components	305 306				
		Unintuitive and / or error prone system manual - communication equipment. Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)	306				
		Unintuitive and / or error prone system manual - communication equipment. Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.) Altitude deviation	306 312				
		Unintuitive and / or error prone system manual - communication equipment. Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.) Altitude deviation Level bust (pilot lapse or late re-clearance by ATC)	306 312 313				
		Unintuitive and / or error prone system manual - communication equipment. Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.) Altitude deviation Level bust (pilot lapse or late re-clearance by ATC) Failure to comply with an altitude or speed restriction / constraint	306 312 313 315				
		Unintuitive and / or error prone system manual - communication equipment. Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.) Altitude deviation Level bust (pilot lapse or late re-clearance by ATC)	306 312 313				
		Unintuitive and / or error prone system manual - communication equipment. Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.) Altitude deviation Level bust (pilot lapse or late re-clearance by ATC) Failure to comply with an altitude or speed restriction / constraint Navigation deviation	306 312 313 315 317				
		Unintuitive and / or error prone system manual - communication equipment. Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.) Altitude deviation Level bust (pilot lapse or late re-clearance by ATC) Failure to comply with an altitude or speed restriction / constraint Navigation deviation Inadequate coordination between ATM centers and/or ATC sectors Flaws in Airspace and Air Traffic planning procedures design process Flaws in conflict and separation minima infringement detection / elimination	306 312 313 315 317 321				
		Unintuitive and / or error prone system manual - communication equipment. Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.) Altitude deviation Level bust (pilot lapse or late re-clearance by ATC) Failure to comply with an altitude or speed restriction / constraint Navigation deviation Inadequate coordination between ATM centers and/or ATC sectors Flaws in Airspace and Air Traffic planning procedures design process Flaws in conflict and separation minima infringement detection / elimination procedures	306 312 313 315 317 321 323 326				
		Unintuitive and / or error prone system manual - communication equipment. Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.) Altitude deviation Level bust (pilot lapse or late re-clearance by ATC) Failure to comply with an altitude or speed restriction / constraint Navigation deviation Inadequate coordination between ATM centers and/or ATC sectors Flaws in Airspace and Air Traffic planning procedures design process Flaws in conflict and separation minima infringement detection / elimination procedures Lack of adherence of airlines to time contraints and deadlines in terms of providing the	306 312 313 315 317 321 323 326				
		Unintuitive and / or error prone system manual - communication equipment. Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.) Altitude deviation Level bust (pilot lapse or late re-clearance by ATC) Failure to comply with an altitude or speed restriction / constraint Navigation deviation Inadequate coordination between ATM centers and/or ATC sectors Flaws in Airspace and Air Traffic planning procedures design process Flaws in conflict and separation minima infringement detection / elimination procedures Lack of adherence of airlines to time contraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data.	306 312 313 315 317 321 323 326				
		Unintuitive and / or error prone system manual - communication equipment. Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.) Altitude deviation Level bust (pilot lapse or late re-clearance by ATC) Failure to comply with an altitude or speed restriction / constraint Navigation deviation Inadequate coordination between ATM centers and/or ATC sectors Flaws in Airspace and Air Traffic planning procedures design process Flaws in conflict and separation minima infringement detection / elimination procedures Lack of adherence of airlines to time contraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data. Inadequate certification process and / or flaws in methodology concerning verification	306 312 313 315 317 321 323 326				
		Unintuitive and / or error prone system manual - communication equipment. Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.) Altitude deviation Level bust (pilot lapse or late re-clearance by ATC) Failure to comply with an altitude or speed restriction / constraint Navigation deviation Inadequate coordination between ATM centers and/or ATC sectors Flaws in Airspace and Air Traffic planning procedures design process Flaws in conflict and separation minima infringement detection / elimination procedures Lack of adherence of airlines to time contraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MTCD System	306 312 313 315 317 321 323 326				
		Unintuitive and / or error prone system manual - communication equipment. Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.) Altitude deviation Level bust (pilot lapse or late re-clearance by ATC) Failure to comply with an altitude or speed restriction / constraint Navigation deviation Inadequate coordination between ATM centers and/or ATC sectors Flaws in Airspace and Air Traffic planning procedures design process Flaws in conflict and separation minima infringement detection / elimination procedures Lack of adherence of airlines to time contraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data. Inadequate certification process and / or flaws in methodology concerning verification	306 312 313 315 317 321 323 326 327				
		Unintuitive and / or error prone system manual - communication equipment. Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.) Altitude deviation Level bust (pilot lapse or late re-clearance by ATC) Failure to comply with an altitude or speed restriction / constraint Navigation deviation Inadequate coordination between ATM centers and/or ATC sectors Flaws in Airspace and Air Traffic planning procedures design process Flaws in conflict and separation minima infringement detection / elimination procedures Lack of adherence of airlines to time contraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MTCD System Lack of adherence of airlines to declared Flight Plan.	312 313 315 317 321 323 326 327 328				



SPIs: System of

c	Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	Organisations
T		Military activity in controlled airport or located within controlled area	339			or ior organisation	- Gramoutions
		General aviation activity in controlled airport or located within controlled area	340				
		Intensified traffic related to general aviation activity e. g. over GA airport / airfield	342				
		Deviation from flight trajectory commanded by controller	343				
		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)	410				
_		Flaws in aircraft system maintenance process definition - Onboard navigational systems	491				
		and components	731				
		Flaws in manufacturer quality control process - Fire extinguishing system components	482				
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Flaws in manufacturer quality control process - FMS subsystem and components 306 (autopilot incl.) 312 Altitude deviation Level bust (pilot lapse or late re-clearance by ATC) 313 Failure to comply with an altitude or speed restriction / constraint 315 317 nadequate coordination between ATM centers and/or ATC sectors 321 Flaws in Airspace and Air Traffic planning procedures design process 323 Flaws in conflict and separation minima infringement detection / elimination 326 procedures 327 Lack of adherence of airlines to time contraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data. Inadequate certification process and / or flaws in methodology concerning verification 328 of the system / product compliance with requirements - MTCD System Lack of adherence of airlines to declared Flight Plan. 329 Failure to identify the pre-tactical conflict before it reach the tactical controller Lack of adherence to SOP for Airborne operation in terms of minimum seprataion 331 Incorrect use of communication equipment 336 Military activity in controlled airport or located within controlled area 339 General aviation activity in controlled airport or located within controlled area 340 Intensified traffic related to general aviation activity e.g. over GA airport / airfield 342 Deviation from flight trajectory commanded by controller 343 Flaws in aircraft system maintenance process definition - FMS subsystems and 410 components (autopilot incl.) 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Lack of adherence to SOP for take-off procedure in terms of altimeter callibration



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Code	Identifiable precursors Lack of adherence to Rules of the Air - adherence to Controller clearance	NO. 296	SPIs: Technology	SPIs: Human	SPIs: Organisation	Organisations
	Inadequate certification process and / or flaws in methodology concerning verification	299				
	of the system / product compliance with requirements - FMS subsystems and	233				
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	Flaws in Tactical or / and Planning Controller requirements definition process and/or	301				
	training methodology	301				
	Unintuitive and / or error prone system manual - communication equipment.	305				
	Flaws in manufacturer quality control process - FMS subsystem and components	306				
	(autopilot incl.)	300				
	Altitude deviation	312				1
	Level bust (pilot lapse or late re-clearance by ATC)	313				1
	Failure to comply with an altitude or speed restriction / constraint	315				
	Navigation deviation	317				1
	Inadequate coordination between ATM centers and/or ATC sectors	321				1
	Flaws in Airspace and Air Traffic planning procedures design process	323				+
	Flaws in conflict and separation minima infringement detection / elimination	326				+
	procedures	320				
	Lack of adherence of airlines to time contraints and deadlines in terms of providing the	227				
	Network Manager Operation Centre with obligatory data.	327				
		328				+
	of the system / product compliance with requirements - MTCD System	320				
		329				
	Lack of adherence of airlines to declared Flight Plan.	330		+		+
	Failure to identify the pre-tactical conflict before it reach the tactical controller	-		+		+
+	Lack of adherence to SOP for Airborne operation in terms of minimum seprataion	331		+		+
	Incorrect use of communication equipment Military activity is controlled signer or located within controlled area.	336		+		+
	Military activity in controlled airport or located within controlled area	339		+	+	+
-	General aviation activity in controlled airport or located within controlled area	340	1	+	+	+
	Intensified traffic related to general aviation activity e. g. over GA airport / airfield	342		+	+	+
	Deviation from flight trajectory commanded by controller	343		+		
	Flaws in aircraft system maintenance process definition - FMS subsystems and	410				1
	components (autopilot incl.)			+	+	+
	Flaws in aircraft system maintenance process definition - Onboard navigational systems	491				
	and components					
	Flaws in manufacturer quality control process - Fire extinguishing system components	482				
		_				
	Flaws in manufacturer quality control process - Onboard navigational systems and	493				
	components.	_				
	Traffic controller tiredness - Inadequate workload distribution	137				
	Flaws in traffic controller requirements definition process and/or training methodology	145				
	Flaws in Airspace and Air Traffic planning procedures design process	323				
	Lack of adherence to the current technology standards in terms of flight safety	344				
	supporting systems. Lack of STCA System.					
	Lack of adherence to regulations concerning independent ATCO monitoring	346				
	Inadequate certification process and / or flaws in methodology concerning verification	351				
	of the system / product compliance with requirements - STCA System					
57 ER31B112	Adverse weather / poor visibility conditions / darkness	6	1; 3;	18; 19; 20; 21; 25	27; 31; 32; 33; 34; 35;	47; 48; 50; 51; 52; 5
					39;	54; 55; 56; 57; 58; 5
		_				60; 61; 62; 63
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168				
	System failure affecting the operation of primary instruments / displays or standby	26				
	instruments			1		<u> </u>
	Airspace infringement	71				
	Other cases of loss of separation	72				
	Prolonged loss of communication (PLOC) between pilot and controller	73				
	Convective weather encounter in traffic intensive airport proximity	76				
	System failure affecting the operation of primary instruments / displays or standby	78				
	instruments - ADS-B System	\perp		<u> </u>		<u> </u>
	Lack of English proficiency	132				
	Incorrect or confusing / misleading ATC instructions	133				
	Use of non-standard phraseology by pilot and/or controller	134				
	Traffic controller tiredness - Inadequate workload distribution	137				
	Flaws in traffic controller requirements definition process and/or training methodology	145				
		1		<u> </u>	<u></u>	<u> </u>
	Lack of or poor communication quality	146				
	Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	148				
	driver	\perp		<u> </u>	<u> </u>	
	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
	or / and passive contribution to the PF duties	L		<u> </u>	<u> </u>	<u> </u>
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168				
	Hearback ommitted	169				
	Flaws in aircraft system maintenance process definition - Communication equipment	270				
	systems and components.	1				
	Inadequate certification process and / or flaws in methodology concerning verification	271				
	of the system / product compliance with requirements - Communication equipment	1				1
	systems and components.	1				
		-		+	+	†
		277				
	Flaws in manufacturer quality control process - Communication equipment systems	272				
	Flaws in manufacturer quality control process - Communication equipment systems and components.					
	Flaws in manufacturer quality control process - Communication equipment systems and components. Altimeter setting error	274				
	Flaws in manufacturer quality control process - Communication equipment systems and components.					



SPIs: System of Code Identifiable precursors No. SPIs: Technology SPIs: Human SPIs: Organisation Organisations Inadequate certification process and / or flaws in methodology concerning verification 299 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) Tactical or / and Planning Controller tiredness - Inadequate workload distribution 300 Flaws in Tactical or / and Planning Controller requirements definition process and/or 301 training methodology Unintuitive and / or error prone system manual - communication equipment. 305 Flaws in manufacturer quality control process - FMS subsystem and components 306 (autopilot incl.) 312 Altitude deviation Level bust (pilot lapse or late re-clearance by ATC) 313 Failure to comply with an altitude or speed restriction / constraint 317 Navigation deviation Inadequate coordination between ATM centers and/or ATC sectors 321 Flaws in Airspace and Air Traffic planning procedures design process 323 326 Flaws in conflict and separation minima infringement detection / elimination procedures Lack of adherence of airlines to time contraints and deadlines in terms of providing the 327 Network Manager Operation Centre with obligatory data. Inadequate certification process and / or flaws in methodology concerning verification 328 of the system / product compliance with requirements - MTCD System Lack of adherence of airlines to declared Flight Plan. 329 Failure to identify the pre-tactical conflict before it reach the tactical controller 330 Lack of adherence to SOP for Airborne operation in terms of minimum seprataion 331 ncorrect use of communication equipment 336 Military activity in controlled airport or located within controlled area 339 General aviation activity in controlled airport or located within controlled area 340 Intensified traffic related to general aviation activity e.g. over GA airport / airfield Deviation from flight trajectory commanded by controller 343 Flaws in aircraft system maintenance process definition - FMS subsystems and 410 components (autopilot incl.) Flaws in aircraft system maintenance process definition - Onboard navigational system 491 and components Flaws in manufacturer quality control process - Fire extinguishing system components 482 Flaws in manufacturer quality control process - Onboard navigational systems and 493 components. Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology 145 Flaws in Airspace and Air Traffic planning procedures design process 323 Lack of adherence to the current technology standards in terms of flight safety 344 supporting systems. Lack of STCA System. Lack of adherence to regulations concerning independent ATCO monitoring nadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - STCA System 47: 48: 50: 51: 52: 53: 58 FR31B113 Pilot tiredness - Inadequate workload distribution 167 1: 3: 18: 19: 20: 21: 25 27; 31; 32; 33; 34; 35; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63 Flaws in pilot requirements definition process and/or training methodology 168 System failure affecting the operation of primary instruments / displays or standby instruments Airspace infringement 71 Other cases of loss of separation Prolonged loss of communication (PLOC) between pilot and controller 73 Convective weather encounter in traffic intensive airport proximity System failure affecting the operation of primary instruments / displays or standby 78 instruments - ADS-B System Lack of English proficiency 132 Incorrect or confusing / misleading ATC instructions 133 Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution 137 Flaws in traffic controller requirements definition process and/or training methodology 145 Lack of or poor communication quality 146 Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle 148 Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties 167 Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology 168 Hearback ommitted Flaws in aircraft system maintenance process definition - Communication equipment 270 systems and components. nadequate certification process and / or flaws in methodology concerning verification 271 of the system / product compliance with requirements - Communication equipment systems and components. Flaws in manufacturer quality control process - Communication equipment systems 272 and components. 274 Altimeter setting error Lack of adherence to SOP for take-off procedure in terms of altimeter callibration 294 Lack of adherence to Rules of the Air - adherence to Controller clearance 296 nadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and omponents (autopilot incl.)



SPIs: System of

Code	Identifiable precursors	No	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
Code	Tactical or / and Planning Controller tiredness - Inadequate workload distribution	300	oris. reciliology	Jris. numan	Jris. Organisation	Organisations
_	Flaws in Tactical or / and Planning Controller requirements definition process and/or	301		+	+	
	training methodology	301				
_	Unintuitive and / or error prone system manual - communication equipment.	305		+	+	
_	Flaws in manufacturer quality control process - FMS subsystem and components	306		+	+	
	(autopilot incl.)	300				
_	Altitude deviation	312		+	+	
	Level bust (pilot lapse or late re-clearance by ATC)	313				
_		_				
	Failure to comply with an altitude or speed restriction / constraint	315				
	Navigation deviation	317				
	Inadequate coordination between ATM centers and/or ATC sectors	321				
	Flaws in Airspace and Air Traffic planning procedures design process	323				
	Flaws in conflict and separation minima infringement detection / elimination	326				
	procedures	₩				
	Lack of adherence of airlines to time contraints and deadlines in terms of providing the	327				
	Network Manager Operation Centre with obligatory data.					
	Inadequate certification process and / or flaws in methodology concerning verification	328				
	of the system / product compliance with requirements - MTCD System					
	Lack of adherence of airlines to declared Flight Plan.	329				
	Failure to identify the pre-tactical conflict before it reach the tactical controller	330				
	Lack of adherence to SOP for Airborne operation in terms of minimum seprataion	331				
	Incorrect use of communication equipment	336				
	Military activity in controlled airport or located within controlled area	339				
	General aviation activity in controlled airport or located within controlled area	340				
	Intensified traffic related to general aviation activity e. g. over GA airport / airfield	342				
	Deviation from flight trajectory commanded by controller	343		†	+	
+	Flaws in aircraft system maintenance process definition - FMS subsystems and	410		+	+	
1	components (autopilot incl.)	410		1		
+		101		+	+	
	Flaws in aircraft system maintenance process definition - Onboard navigational systems	491				
	and components	400		+	+	1
	Flaws in manufacturer quality control process - Fire extinguishing system components	482				
	<u> </u>	 		1	+	
	Flaws in manufacturer quality control process - Onboard navigational systems and	493				
	components.	Ь				
	Traffic controller tiredness - Inadequate workload distribution	137				
	Flaws in traffic controller requirements definition process and/or training methodology	145				
	Flaws in Airspace and Air Traffic planning procedures design process	323				
	Lack of adherence to the current technology standards in terms of flight safety	344				
	supporting systems. Lack of STCA System.					
	Lack of adherence to regulations concerning independent ATCO monitoring	346				
	Inadequate certification process and / or flaws in methodology concerning verification	351				
	of the system / product compliance with requirements - STCA System	331				
59 ER31B114		70	1; 3;	18; 19; 20; 21; 25	27; 31; 32; 33; 34; 35;	47; 48; 50; 51; 52
39 EN31B114	TCAS RA events (genuine or spurious)	70	1, 3,	10, 19, 20, 21, 23	39;	54; 55; 56; 57; 58
					33,	60; 61; 62; 63
	Contain failure official the constitution of mineral instruments / displace or standby.	26		+		00, 01, 02, 03
	System failure affecting the operation of primary instruments / displays or standby	20				
	instruments					
	Airspace infringement	71				
	Other cases of loss of separation	72				
	Prolonged loss of communication (PLOC) between pilot and controller	73				
	Convective weather encounter in traffic intensive airport proximity	76				
	System failure affecting the operation of primary instruments / displays or standby	78		1		
		7.0				
	instruments - ADS-B System					
	instruments - ADS-B System Lack of English proficiency	132				
	Lack of English proficiency	132				
	Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller	132 133 134				
	Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution	132 133				
	Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller	132 133 134 137				
	Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology	132 133 134 137 145				
	Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality	132 133 134 137 145				
	Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	132 133 134 137 145				
	Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	132 133 134 137 145 146 148				
	Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	132 133 134 137 145				
	Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	132 133 134 137 145 146 148				
	Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution	132 133 134 137 145 146 148 151				
	Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	132 133 134 137 145 146 148 151 167 168				
	Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Hearback ommitted	132 133 134 137 145 146 148 151 167 168 169				
	Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Hearback ommitted Flaws in aircraft system maintenance process definition - Communication equipment	132 133 134 137 145 146 148 151 167 168				
	Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Hearback ommitted	132 133 134 137 145 146 148 151 167 168 169				
	Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Hearback ommitted Flaws in aircraft system maintenance process definition - Communication equipment	132 133 134 137 145 146 148 151 167 168 169				
	Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Hearback ommitted Flaws in aircraft system maintenance process definition - Communication equipment systems and components.	132 133 134 137 145 146 148 151 167 168 169 270				
	Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Hearback ommitted Flaws in aircraft system maintenance process definition - Communication equipment systems and components. Inadequate certification process and / or flaws in methodology concerning verification	132 133 134 137 145 146 148 151 167 168 169 270				
	Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Hearback ommitted Flaws in aircraft system maintenance process definition - Communication equipment systems and components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.	132 133 134 137 145 146 148 151 167 168 169 270				
	Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Hearback ommitted Flaws in aircraft system maintenance process definition - Communication equipment systems and components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components. Flaws in manufacturer quality control process - Communication equipment systems	132 133 134 137 145 146 148 151 167 168 169 270				
	Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Hearback ommitted Flaws in aircraft system maintenance process definition - Communication equipment systems and components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components. Flaws in manufacturer quality control process - Communication equipment systems and components.	132 133 134 137 145 146 151 167 168 169 270 271				
	Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Hearback onmitted Flaws in aircraft system maintenance process definition - Communication equipment systems and components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components. Flaws in manufacturer quality control process - Communication equipment systems and components. Altimeter setting error	132 133 134 137 145 146 151 167 168 169 270 271				
	Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Hearback ommitted Flaws in aircraft system maintenance process definition - Communication equipment systems and components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components. Flaws in manufacturer quality control process - Communication equipment systems and components. Flaws in manufacturer quality control process - Communication equipment systems and components.	132 133 134 137 145 146 148 151 167 168 169 270 271 272				
	Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Hearback ommitted Flaws in aircraft system maintenance process definition - Communication equipment systems and components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components. Flaws in manufacturer quality control process - Communication equipment systems and components. Altimeter setting error Lack of adherence to SOP for take-off procedure in terms of altimeter callibration. Lack of adherence to Rules of the Air - adherence to Controller clearance	132 133 134 137 145 146 148 151 167 168 169 270 271 272 272 274 294 296				
	Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Hearback ommitted Flaws in aircraft system maintenance process definition - Communication equipment systems and components. Flaws in manufacture quality control process - Communication equipment systems and components. Flaws in manufacturer quality control process - Communication equipment systems and components. Altimeter setting error Lack of adherence to SOP for take-off procedure in terms of altimeter callibration. Lack of adherence to Rules of the Air - adherence to Controller clearance inadequate certification process and / or flaws in methodology concerning verification	132 133 134 137 145 146 148 151 167 168 169 270 271 272				
	Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Hearback ommitted Flaws in aircraft system maintenance process definition - Communication equipment systems and components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components. Flaws in manufacturer quality control process - Communication equipment systems and components. Altimeter setting error Lack of adherence to SOP for take-off procedure in terms of altimeter callibration. Lack of adherence to Rules of the Air - adherence to Controller clearance in adequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and	132 133 134 137 145 146 148 151 167 168 169 270 271 272 272 274 294 296				
	Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Hearback ommitted Flaws in aircraft system maintenance process definition - Communication equipment systems and components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components. Flaws in manufacturer quality control process - Communication equipment systems and components. Altimeter setting error Lack of adherence to SOP for take-off procedure in terms of altimeter callibration. Lack of adherence to Rules of the Air - adherence to Controller clearance Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	132 133 134 145 146 148 151 167 168 270 271 272 274 294 296 299				
	Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Hearback ommitted Flaws in aircraft system maintenance process definition - Communication equipment systems and components. Flaws in manufacture quality control process - Communication equipment systems and components. Altimeter setting error Lack of adherence to Rules of the Air - adherence to Controller clearance Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components. Altimeter setting error Lack of adherence to Rules of the Air - adherence to Controller clearance Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) Tactical or / and Planning Controller tiredness - Inadequate workload distribution	132 133 134 137 145 148 151 167 168 169 270 271 272 274 294 296 299				
	Lack of English proficiency Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Hearback ommitted Flaws in aircraft system maintenance process definition - Communication equipment systems and components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components. Flaws in manufacturer quality control process - Communication equipment systems and components. Altimeter setting error Lack of adherence to SOP for take-off procedure in terms of altimeter callibration. Lack of adherence to Rules of the Air - adherence to Controller clearance Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	132 133 134 145 146 148 151 167 168 270 271 272 274 294 296 299				



SPIs: System of Code Identifiable precursors No. SPIs: Technology SPIs: Human **SPIs: Organisation** Organisations Flaws in manufacturer quality control process - FMS subsystem and components 306 (autopilot incl.) Altitude deviation 312 Level bust (pilot lapse or late re-clearance by ATC) 313 Failure to comply with an altitude or speed restriction / constraint 315 317 Navigation deviation nadequate coordination between ATM centers and/or ATC sectors 321 Flaws in Airspace and Air Traffic planning procedures design process 323 Flaws in conflict and separation minima infringement detection / elimination 326 procedures Lack of adherence of airlines to time contraints and deadlines in terms of providing the 327 Network Manager Operation Centre with obligatory data. nadequate certification process and / or flaws in methodology concerning verification 328 of the system / product compliance with requirements - MTCD System 329 Lack of adherence of airlines to declared Flight Plan. Failure to identify the pre-tactical conflict before it reach the tactical controller 330 Lack of adherence to SOP for Airborne operation in terms of minimum seprataion 331 Incorrect use of communication equipment 336 Military activity in controlled airport or located within controlled area 339 General aviation activity in controlled airport or located within controlled area 340 Intensified traffic related to general aviation activity e. g. over GA airport / airfield 342 343 Deviation from flight trajectory commanded by controller Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.) Flaws in aircraft system maintenance process definition - Onboard navigational system 491 and components Flaws in manufacturer quality control process - Fire extinguishing system components Flaws in manufacturer quality control process - Onboard navigational systems and 493 components. Traffic controller tiredness - Inadequate workload distribution 137 Flaws in traffic controller requirements definition process and/or training methodology 145 Flaws in Airspace and Air Traffic planning procedures design process Lack of adherence to the current technology standards in terms of flight safety 344 supporting systems. Lack of STCA System. Lack of adherence to regulations concerning independent ATCO monitoring 346 Inadequate certification process and / or flaws in methodology concerning verification 351 of the system / product compliance with requirements - STCA System 60 ER31B12 Pilot tiredness - Inadequate workload distribution 167 1; 3; 18; 19; 20; 21; 25 27; 31; 32; 33; 34; 35; 47; 48; 50; 51; 52; 53; 39: 54; 55; 56; 57; 58; 59; 60; 61; 62; 63 Flaws in pilot requirements definition process and/or training methodology 168 318 Inappropriate visual avoidance maneuver System failure affecting the operation of primary instruments / displays or standby instruments Airspace infringement 71 72 Other cases of loss of separation Prolonged loss of communication (PLOC) between pilot and controller 73 Convective weather encounter in traffic intensive airport proximity System failure affecting the operation of primary instruments / displays or standby 78 instruments - ADS-B System Lack of English proficiency 132 Incorrect or confusing / misleading ATC instructions 133 134 Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology 145 Lack of or poor communication quality 146 148 Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Hearback ommitted 169 Flaws in aircraft system maintenance process definition - Communication equipment 270 systems and components. nadequate certification process and / or flaws in methodology concerning verification 271 of the system / product compliance with requirements - Communication equipment systems and components. Flaws in manufacturer quality control process - Communication equipment systems 272 and components. 274 Altimeter setting error Lack of adherence to SOP for take-off procedure in terms of altimeter callibration 294 Lack of adherence to Rules of the Air - adherence to Controller clearance 296 Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) Tactical or / and Planning Controller tiredness - Inadequate workload distribution 300 Flaws in Tactical or / and Planning Controller requirements definition process and/or 301 training methodology Unintuitive and / or error prone system manual - communication equipment. Flaws in manufacturer quality control process - FMS subsystem and components 306 autopilot incl.)



Code	e	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
		Altitude deviation	312		O. IST Haman	or ior organisation	- Guinsutions
		Level bust (pilot lapse or late re-clearance by ATC)	313				
		Failure to comply with an altitude or speed restriction / constraint	315				
		Navigation deviation	317				
		Inadequate coordination between ATM centers and/or ATC sectors	321				
		Flaws in Airspace and Air Traffic planning procedures design process	323				
		Flaws in conflict and separation minima infringement detection / elimination	326				
		procedures					
		Lack of adherence of airlines to time contraints and deadlines in terms of providing the	327				
		Network Manager Operation Centre with obligatory data.					
			328				
		of the system / product compliance with requirements - MTCD System					
		Lack of adherence of airlines to declared Flight Plan.	329				
		Failure to identify the pre-tactical conflict before it reach the tactical controller	330				
		Lack of adherence to SOP for Airborne operation in terms of minimum seprataion	331				
		Incorrect use of communication equipment	336 339				
		Military activity in controlled airport or located within controlled area	340				
		General aviation activity in controlled airport or located within controlled area	340				
		Intensified traffic related to general aviation activity e. g. over GA airport / airfield Deviation from flight trajectory commanded by controller	343				
		Flaws in aircraft system maintenance process definition - FMS subsystems and	410				
		components (autopilot incl.)	410				
		Flaws in aircraft system maintenance process definition - Onboard navigational systems	191				
		and components	431				
_		Flaws in manufacturer quality control process - Fire extinguishing system components	482				+
			.52				
		Flaws in manufacturer quality control process - Onboard navigational systems and	493				
		components.	1				
		Traffic controller tiredness - Inadequate workload distribution	137				
		Flaws in traffic controller requirements definition process and/or training methodology	-				
		,, ,, , ,, , , ,	1				
		Flaws in Airspace and Air Traffic planning procedures design process	323				
		Lack of adherence to the current technology standards in terms of flight safety	344				
		supporting systems. Lack of STCA System.					
		Lack of adherence to regulations concerning independent ATCO monitoring	346				
		Inadequate certification process and / or flaws in methodology concerning verification	351				
		of the system / product compliance with requirements - STCA System					
61 ER31	1C3	not identidiable at that level		1; 3;	18; 19; 20; 21; 25	27; 31; 32; 33; 34; 35; 39;	47; 48; 50; 51; 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
		System failure affecting the operation of primary instruments / displays or standby	26				00, 01, 02, 03
		instruments	-				
		Airspace infringement	71				
		Other cases of loss of separation	72				
		Prolonged loss of communication (PLOC) between pilot and controller	73				
		Convective weather encounter in traffic intensive airport proximity	76				
		System failure affecting the operation of primary instruments / displays or standby	78				
		instruments - ADS-B System					
		Lack of English proficiency	132				
		Incorrect or confusing / misleading ATC instructions	133				
		Use of non-standard phraseology by pilot and/or controller	134				
		Traffic controller tiredness - Inadequate workload distribution	137				
		Flaws in traffic controller requirements definition process and/or training methodology	145				
		Lack of or poor communication quality	146				
		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	148				
		driver	1				
		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
		or / and passive contribution to the PF duties	4.5-			1	1
		Pilot tiredness - Inadequate workload distribution	167			1	1
		Flaws in pilot requirements definition process and/or training methodology	168				<u> </u>
		Hearback ommitted	169				
		Flaws in aircraft system maintenance process definition - Communication equipment	270				
_		systems and components.	271				
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment	2/1				
		or the system / product compliance with requirements - Communication equipment systems and components.	1	1			
_		Flaws in manufacturer quality control process - Communication equipment systems	272				+
		and components.	2/2				
-		Altimeter setting error	274				
		Lack of adherence to SOP for take-off procedure in terms of altimeter callibration.	294				+
_		Lack of adherence to SOP for take-on procedure in terms of admireter cambration.	296				
		Inadequate certification process and / or flaws in methodology concerning verification	299				
		of the system / product compliance with requirements - FMS subsystems and		1			
		components (autopilot incl.)	1				
		Tactical or / and Planning Controller tiredness - Inadequate workload distribution	300				
		Flaws in Tactical or / and Planning Controller requirements definition process and/or	301				
		training methodology	1	1			
_		Unintuitive and / or error prone system manual - communication equipment.	305				
		Flaws in manufacturer quality control process - FMS subsystem and components	306				1
		(autopilot incl.)	1				
		Altitude deviation	312				
		Level bust (pilot lapse or late re-clearance by ATC)	313				
		Failure to comply with an altitude or speed restriction / constraint	315				
		Navigation deviation	317				
	_		_				



SPIs: System of

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	Organisations
	Inadequate coordination between ATM centers and/or ATC sectors	321				
	Flaws in Airspace and Air Traffic planning procedures design process	323				
	Flaws in conflict and separation minima infringement detection / elimination	326				
	procedures					
	Lack of adherence of airlines to time contraints and deadlines in terms of providing the	327				
	Network Manager Operation Centre with obligatory data.					
	Inadequate certification process and / or flaws in methodology concerning verification	328				
	of the system / product compliance with requirements - MTCD System					
	Lack of adherence of airlines to declared Flight Plan.	329				
	Failure to identify the pre-tactical conflict before it reach the tactical controller	330				
	Lack of adherence to SOP for Airborne operation in terms of minimum seprataion	331				
	Incorrect use of communication equipment	336				
	Military activity in controlled airport or located within controlled area	339				
	General aviation activity in controlled airport or located within controlled area	340				
	Intensified traffic related to general aviation activity e. g. over GA airport / airfield	342				
	Deviation from flight trajectory commanded by controller	343				
	Flaws in aircraft system maintenance process definition - FMS subsystems and	410				
	components (autopilot incl.)					
	Flaws in aircraft system maintenance process definition - Onboard navigational systems	491				
	and components					
	Flaws in manufacturer quality control process - Fire extinguishing system components	482				
	Flaws in manufacturer quality control process - Onboard navigational systems and	493				
	components.					
	Traffic controller tiredness - Inadequate workload distribution	137				
	Flaws in traffic controller requirements definition process and/or training methodology	145				
	Flaws in Airspace and Air Traffic planning procedures design process	323				
	Lack of adherence to the current technology standards in terms of flight safety	344				
	supporting systems. Lack of STCA System.					
	Lack of adherence to regulations concerning independent ATCO monitoring	346				
	Inadequate certification process and / or flaws in methodology concerning verification	351				
	of the system / product compliance with requirements - STCA System					



_		precursors a					
							SPIs: System of
ď	Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	Organisations
19 (Code	Identifiable precursors		Technology	Human	Organisation	System of
							Organisations
- 1		Unstable Approach	uniq				
			ue num				
			bers				
			Bers				
1 /	AL19B111	Lack of adherence to SOP in terms of approach and landing	245		15; 16; 17; 20; 23; 24;	26; 27; 32; 34; 35; 36;	50; 51; 54; 55; 58; 5
					25	38; 39;	61; 62;
_		Pilot tiredness - Inadequate workload distribution	167				
- 1	114004424	Flaws in pilot requirements definition process and/or training methodology	168		46.47	26 20 20 20	
2 /	AL19B1121	Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing	246		16; 17;	26; 28; 29; 30;	50; 51; 59; 61; 62;
\dashv		Pilot tiredness - Inadequate workload distribution	167				30, 31, 33, 01, 02,
		Flaws in pilot requirements definition process and/or training methodology	168				
3 <i>F</i>	AL19B1122	Lack of adherence to SOP in terms of approach and landing	245		15; 16; 17; 19; 20; 23;	26; 27; 29; 30; 32; 34;	50; 51; 54; 55; 58; 5
					24; 25	35; 36; 38; 39;	60; 62;
_		Pilot tiredness - Inadequate workload distribution	167				
_		Flaws in pilot requirements definition process and/or training methodology	168				
\dashv		Flaws in CRM training procedures	263				
4	AL19B113	Lack of adherence to the main CRM rules Incorrect use of automation - FMS	264 269		15; 16; 17; 19; 20; 23;	26; 27; 32; 34; 35; 36;	47; 50; 51; 54; 55; 5
4/		meorrect use of automation - rivis	209		24; 25	26; 27; 32; 34; 35; 36; 38; 39; 40;	59; 60; 62;
+		Pilot tiredness - Inadequate workload distribution	167		,	20, 33, 40,	,,,
		Flaws in pilot requirements definition process and/or training methodology	168				
		Unintuitive and / or error prone system manual - FMS	494				
5 A	AL19B121	Lack of adherence to the current technology standards in terms of flight safety	248		15; 16; 17; 19; 20; 23;	26; 27; 32; 34; 35; 36;	47; 48; 50; 51; 52;
		supporting systems. Lack of ILS on descent path			24; 25	38; 39;	56; 57; 58; 59; 60; 6
_							63
	AL19B122	Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off	6 32		10, 10, 10, 20, 21, 22,	26; 31; 34; 35; 36; 39;	48; 50; 51; 54; 55;
О	ALI9BIZZ	convective weather / turbulence / windshear or crosswind conditions during take-on	32		16; 18; 19; 20; 21; 23;	20; 31; 34; 35; 30; 39;	59; 60; 61; 62;
\dashv		Lack of adherence to SARPs included in Annex 14 and related documents in terms of	249				33, 00, 01, 02,
		temporary suspension of operation on airport inthe case of adverse weather.					
7 /	AL19B123	Convective weather / turbulence / windshear or crosswind conditions during take-off	32		14; 16; 17; 23;	26; 35; 36; 39; 42;	48; 50; 51; 52; 53;
							55; 58; 59; 60; 61; 6
		Lack of adherence to SARPs included in Annex 14 and related documents in terms of	249				
_		temporary suspension of operation on airport inthe case of adverse weather.					
		Lack of adherence to SARPs included in Annex 14 and related documents in terms of	295				
П		RWY parameters and location, approach path parameters and obstacles locations. Flight crew fails to initiate and execute missed approach	+				
_	AL19B211	Pilot tiredness - Inadequate workload distribution	167		14; 15; 16; 17; 18; 19;	26; 27; 28; 29; 30; 31;	47; 48; 50; 51; 52; 5
					20; 21; 23; 24; 25	32; 34; 35; 36; 38; 39;	54; 55; 56; 57; 58; 5
						40; 42;	60; 61; 62; 63
		Flaws in pilot requirements definition process and/or training methodology	168				
_		Adverse weather / poor visibility conditions / darkness	6				
		Convective weather / turbulence / windshear or crosswind conditions during take-off	32				
\rightarrow		Lack of adherence to SOP in terms of approach and landing	245				
\dashv		Pilot tiredness - Inadequate workload distribution	167				
_		Flaws in pilot requirements definition process and/or training methodology	168				
		Lack of adherence to SOP in terms of briefing and checklist before initiating of	246				
		approach and landing					
_		Flaws in CRM training procedures	263				
\dashv		Lack of adherence to the main CRM rules	264		1	-	-
+		Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety	269 248				
		supporting systems. Lack of ILS on descent path	248				
			249		+		
+		Lack of adherence to SARPs included in Annex 14 and related documents in terms of	249				
+			249				
+		Lack of adherence to SARPs included in Annex 14 and related documents in terms of	295				
		Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.	295				
		Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS	295 494				
9 4	AL19B212	Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Flaws in pilot requirements definition process and/or training methodology	295 494 168				
9 4	AL19B212	Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Flaws in pilot requirements definition process and/or training methodology Pilot tiredness - Inadequate workload distribution	295 494 168 167				
9 4	AL19B212	Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Flaws in pilot requirements definition process and/or training methodology Pilot tiredness - Inadequate workload distribution Adverse weather / poor visibility conditions / darkness	295 494 168 167 6				
9 4	AL19B212	Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Flaws in pilot requirements definition process and/or training methodology Pilot tiredness - Inadequate workload distribution	295 494 168 167				
9 4	AL19B212	Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Flaws in pilot requirements definition process and/or training methodology Pilot tiredness - Inadequate workload distribution Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing	295 494 168 167 6				
9 4	AL19B212	Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Flaws in pilot requirements definition process and/or training methodology Pilot tiredness - Inadequate workload distribution Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution	295 494 168 167 6 32 245 167				
9 /	AL19B212	Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWV parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Flaws in pilot requirements definition process and/or training methodology Pilot tiredness - Inadequate workload distribution Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	295 494 168 167 6 32 245 167 168				
9 4	AL19B212	Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Flaws in pilot requirements definition process and/or training methodology Pilot tiredness - Inadequate workload distribution Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of	295 494 168 167 6 32 245 167				
9 4	AL19B212	Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Flaws in pilot requirements definition process and/or training methodology Pilot tiredness - Inadequate workload distribution Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing	295 494 168 167 6 32 245 167 168 246				
9 4	AL19B212	Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Flaws in pilot requirements definition process and/or training methodology Pilot tiredness - Inadequate workload distribution Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures	295 494 168 167 6 32 245 167 168 246				
9 /	AL19B212	Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWV parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Flaws in pilot requirements definition process and/or training methodology Pilot tiredness - Inadequate workload distribution Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules	295 494 168 167 6 32 245 167 168 246				
9 4	AL19B212	Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Flaws in pilot requirements definition process and/or training methodology Pilot tiredness - Inadequate workload distribution Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS	295 494 168 167 6 32 245 167 168 246				
9 /	AL19B212	Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWV parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Flaws in pilot requirements definition process and/or training methodology Pilot tiredness - Inadequate workload distribution Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules	295 494 168 167 6 32 245 167 168 246 263 264 269				
9 /	AL19B212	Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Flaws in pilot requirements definition process and/or training methodology Pilot tiredness - Inadequate workload distribution Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety	295 494 168 167 6 32 245 167 168 246 263 264 269				
9 /	AL19B212	Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWV parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Flaws in pilot requirements definition process and/or training methodology Pilot tiredness - Inadequate workload distribution Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path	295 494 168 167 6 32 245 167 168 246 263 264 269 248				
9 4	AL19B212	Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWV parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Flaws in pilot requirements definition process and/or training methodology Pilot tiredness - Inadequate workload distribution Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of	295 494 168 167 6 32 245 167 168 246 263 264 269 248				



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10 AL19B221	Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure	250		13; 14; 15; 16; 17; 18; 19; 20; 21; 23; 24; 25	26; 27; 28; 29; 30; 31; 32; 34; 35; 36; 38; 39; 40; 41; 42;	47; 48; 50; 51; 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
	Pilot tiredness - Inadequate workload distribution	167			40, 41, 42,	00, 01, 02, 03
	Flaws in pilot requirements definition process and/or training methodology	168				
	Aggressive maneuvering / overcontrolling	182				
	Adverse weather / poor visibility conditions / darkness	6				
	Convective weather / turbulence / windshear or crosswind conditions during take-off	32				
	Lack of adherence to SOP in terms of approach and landing	245				
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168				
	Lack of adherence to SOP in terms of briefing and checklist before initiating of	246				
	approach and landing Flaws in CRM training procedures	263				
	Lack of adherence to the main CRM rules	264				
	Incorrect use of automation - FMS	269				
	Lack of adherence to the current technology standards in terms of flight safety	248				
	supporting systems. Lack of ILS on descent path	0				
	Lack of adherence to SARPs included in Annex 14 and related documents in terms of	249				
	temporary suspension of operation on airport inthe case of adverse weather.					
	Lack of adherence to SARPs included in Annex 14 and related documents in terms of	295				
	RWY parameters and location, approach path parameters and obstacles locations.					
	Unintuitive and / or error prone system manual - FMS	494				
11 AL19B222	Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure	250		14; 15; 16; 17; 18; 19; 20; 21; 23; 24; 25	26; 27; 28; 29; 30; 31; 32; 34; 35; 36; 38; 39;	47; 48; 50; 51; 52; 53 54; 55; 56; 57; 58; 59
	Photosophic and a second secon	4.55			40; 42;	60; 61; 62; 63
	Pilot tiredness - Inadequate workload distribution	167				-
-	Flaws in pilot requirements definition process and/or training methodology	168				1
	Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off	6 32				-
	convective weather / turbulence / winushear or crosswing conditions during take-off	32				
	Lack of adherence to SOP in terms of approach and landing	245				
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168				
	Lack of adherence to SOP in terms of briefing and checklist before initiating of	246				
	approach and landing					
	Flaws in CRM training procedures	263				
	Lack of adherence to the main CRM rules	264				
	Incorrect use of automation - FMS	269				
	Lack of adherence to the current technology standards in terms of flight safety	248				
	supporting systems. Lack of ILS on descent path					
	Lack of adherence to SARPs included in Annex 14 and related documents in terms of	249				
	temporary suspension of operation on airport inthe case of adverse weather.					
	Lack of adherence to SARPs included in Annex 14 and related documents in terms of	295				
	RWY parameters and location, approach path parameters and obstacles locations.					
	Unintuitive and / or error prone system manual - FMS	494				
III	Flight crew fails to maintain control					47 40 50 54 52 52
12 AL19B31	not identifiable at the moment			13; 14; 15; 16; 17; 18; 19; 20; 21; 23; 24; 25	26; 27; 28; 29; 30; 31; 32; 34; 35; 36; 38; 39;	47; 48; 50; 51; 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
+	Adverse weather / poor visibility conditions / darkness	6			40; 41; 42;	- 5, 52, 52, 53
	Convective weather / turbulence / windshear or crosswind conditions during take-off	32				
	Lack of adherence to SOP in terms of approach and landing	245				
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168				
	Lack of adherence to SOP in terms of briefing and checklist before initiating of	246				
	approach and landing					
	Flaws in CRM training procedures	263				
	Lack of adherence to the main CRM rules	264				
	Incorrect use of automation - FMS	269				
	Lack of adherence to the current technology standards in terms of flight safety	248				
	supporting systems. Lack of ILS on descent path	240				+
	Lack of adherence to SARPs included in Annex 14 and related documents in terms of	249				
	temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of	295				+
	RWY parameters and location, approach path parameters and obstacles locations.	233				
	Unintuitive and / or error prone system manual - FMS	494				
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168				
	Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure	250				
	Aggressive maneuvering / overcontrolling	182				
13 AL19B32	Lack of adherence to emergency procedures	448		13; 14; 15; 16; 17; 18; 19; 20; 21; 23; 24; 25	26; 27; 28; 29; 30; 31; 32; 34; 35; 36; 38; 39;	47; 48; 50; 51; 52; 53 54; 55; 56; 57; 58; 59
1		\perp			40; 41; 42;	60; 61; 62; 63
	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151			i .	
	or / and passive contribution to the PF duties					
	or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution	167				
	or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168				
	or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Adverse weather / poor visibility conditions / darkness	167 168 6				
	or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168				
	or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off	167 168 6 32				
	or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing	167 168 6 32 245				
	or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution	167 168 6 32 245 167				
	or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168 6 32 245 167 168				
	or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of	167 168 6 32 245 167				
	or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168 6 32 245 167 168				



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_	Incorrect use of automation - FMS	269				
	Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path	248				
	Lack of adherence to SARPs included in Annex 14 and related documents in terms of	249				
	temporary suspension of operation on airport inthe case of adverse weather.					
	Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.	295				
	Unintuitive and / or error prone system manual - FMS	494				
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168				
	Lack of adherence to AIR OPS normal procedures in terms of missed approach	250				
	execution procedure Aggressive maneuvering / overcontrolling	182				
14 AL19B33	Lack of adherence to emergency procedures	448		13; 14; 15; 16; 17; 18;	26; 27; 28; 29; 30; 31;	47; 48; 50; 51; 52; 53;
				19; 20; 21; 23; 24; 25	32; 34; 35; 36; 38; 39; 40; 41; 42;	54; 55; 56; 57; 58; 59; 60; 61; 62; 63
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168				
	Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off	6 32				
	Convective weather / turbulence / windshear or crosswind conditions during take-on	32				
	Lack of adherence to SOP in terms of approach and landing	245				
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168				
	Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing	246				
+	Flaws in CRM training procedures	263				
	Lack of adherence to the main CRM rules	264				
	Incorrect use of automation - FMS	269				
	Lack of adherence to the current technology standards in terms of flight safety	248				
	supporting systems. Lack of ILS on descent path	249				-
	Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather.	249				
	Lack of adherence to SARPs included in Annex 14 and related documents in terms of	295				
	RWY parameters and location, approach path parameters and obstacles locations.					
	Unintuitive and / or error prone system manual - FMS	494				
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology Lack of adherence to AIR OPS normal procedures in terms of missed approach	168 250				
	execution procedure	230				
	Aggressive maneuvering / overcontrolling	182				
15 AL19B34	Lack of adherence to emergency procedures	448		13; 14; 15; 16; 17; 18; 19; 20; 21; 23; 24; 25	26; 27; 28; 29; 30; 31; 32; 34; 35; 36; 38; 39; 40; 41; 42;	47; 48; 50; 51; 52; 53 54; 55; 56; 57; 58; 59 60; 61; 62; 63
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168				
	Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off	6 32				
	Lack of adherence to SOP in terms of approach and landing	245				
	Pilot tiredness - Inadequate workload distribution					
		167				
	Flaws in pilot requirements definition process and/or training methodology	168				
	Lack of adherence to SOP in terms of briefing and checklist before initiating of					
	Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing	168 246				
	Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures	168 246 263				
	Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules	168 246				
	Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures	168 246 263 264				
	Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path	168 246 263 264 269 248				
	Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of	168 246 263 264 269				
	Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather.	168 246 263 264 269 248				
	Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of	168 246 263 264 269 248				
	Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS	263 264 269 248 249 295				
	Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution	263 264 269 248 249 249 249 295				
	Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	263 264 269 248 249 249 295 494 167 168				
	Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Pilot tiredness - inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to AIR OPS normal procedures in terms of missed approach	263 264 269 248 249 249 249 295				
	Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure	168 246 263 264 269 248 249 295 494 167 168 250				
IV	Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Pilot tiredness - inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to AIR OPS normal procedures in terms of missed approach	263 264 269 248 249 249 295 494 167 168				
IV 16 AL19B41	Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure Aggressive maneuvering / overcontrolling	168 246 263 264 269 248 249 295 494 167 168 250	7;	13; 14; 15; 16; 17; 18; 19; 20; 21; 23; 24; 25	26; 27; 28; 29; 30; 31; 32; 34; 35; 36; 38; 39; 40; 41; 42:	54; 55; 56; 57; 58; 59
_	Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure Aggressive maneuvering / overcontrolling Structural failure Inadequate certification process and / or flaws in methodology concerning verification	168 246 263 264 269 248 249 295 494 167 168 250	7;			
_	Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure Aggressive maneuvering / overcontrolling Structural failure Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	168 246 263 264 269 248 249 295 494 167 168 250 182	7;		32; 34; 35; 36; 38; 39;	54; 55; 56; 57; 58; 59
_	Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure Aggressive maneuvering / overcontrolling Structural failure Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	168 246 263 264 269 248 249 295 494 167 168 250 182	7;		32; 34; 35; 36; 38; 39;	54; 55; 56; 57; 58; 59
_	Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure Aggressive maneuvering / overcontrolling Structural failure Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	168 246 263 264 269 248 249 295 494 167 168 250 182 358	7;		32; 34; 35; 36; 38; 39;	54; 55; 56; 57; 58; 59
_	Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure Aggressive maneuvering / overcontrolling Structural failure Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Flaws in aircraft system maintenance process definition - Landing gear components.	168 246 263 264 269 248 249 295 494 167 168 250 182 358	7;		32; 34; 35; 36; 38; 39;	54; 55; 56; 57; 58; 59
_	Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure Aggressive maneuvering / overcontrolling Structural failure Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	168 246 263 264 269 248 249 295 494 167 168 250 182 358	7;		32; 34; 35; 36; 38; 39;	54; 55; 56; 57; 58; 59
_	Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure Aggressive maneuvering / overcontrolling Structural failure Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components.	168 246 263 264 269 248 295 494 167 168 250 182 358	7;		32; 34; 35; 36; 38; 39;	54; 55; 56; 57; 58; 59
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20	AL19853	Descent above desired descent profile High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing DME / ILS DME confusion in assessing the final descent point / FAF Unstabilized final approach (high, fast, steep,) Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components.	413 414 415 416 358 149 150 377 376	7;	13; 14; 15; 16; 17; 18; 19; 20: 21: 23: 24: 25	26; 27; 28; 29; 30; 31; 32: 34: 35: 36: 38: 39:	47; 48; 50; 51; 52; 53; 54: 55: 56: 57: 58: 59
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	Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
	distribution					
	Flaws in aircraft system maintenance process definition - Landing gear components.	377				
	Flaws in manufacturer quality control process - Landing gear components.	376				
	Lack of adherence to AFM limitations for landing	251				
VI	Failure to achieve maximum braking					
22 AL19B61	Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate	45		13; 14; 15; 16; 17; 18; 19; 20; 21; 23; 24; 25	26; 27; 28; 29; 30; 31; 32; 34; 35; 36; 38; 39; 40; 41; 42;	47; 48; 50; 51; 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168				
	Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY					
	surface condition. Snow / ice presence / or runway surface friction rate below					
	minimum					
	Adverse weather / poor visibility conditions / darkness	6				
	Convective weather / turbulence / windshear or crosswind conditions during take-off	32				
	3 3					
	Lack of adherence to SOP in terms of approach and landing	245				
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168				
	Lack of adherence to SOP in terms of briefing and checklist before initiating of	246				
	approach and landing	0				
	Flaws in CRM training procedures	263				
	Lack of adherence to the main CRM rules	264				
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	Incorrect use of automation - FMS	_		-	-	-
	Lack of adherence to the current technology standards in terms of flight safety	248				
-	supporting systems. Lack of ILS on descent path	240		+	+	+
	Lack of adherence to SARPs included in Annex 14 and related documents in terms of	249				
_	temporary suspension of operation on airport in the case of adverse weather.	20-		<u> </u>	<u> </u>	1
	Lack of adherence to SARPs included in Annex 14 and related documents in terms of	295				
	RWY parameters and location, approach path parameters and obstacles locations.					1
	Unintuitive and / or error prone system manual - FMS	494		ļ	ļ	ļ
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168				
	Lack of adherence to AIR OPS normal procedures in terms of missed approach	250				
	execution procedure	\perp				
	Aggressive maneuvering / overcontrolling	182				
	Lack of adherence to emergency procedures	448				
	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
	or / and passive contribution to the PF duties					
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168				
23 AL19B62	Hard landing	47	7; 9;	13; 14; 15; 16; 17; 18;	26; 27; 28; 29; 30; 31;	47; 48; 50; 51; 52; 5
				19; 20; 21; 23; 24; 25	32; 34; 35; 36; 38; 39; 40; 41; 42;	54; 55; 56; 57; 58; 5 60; 61; 62; 63
	System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Source structural failure of aircraft or / and its citical systems resulted from design local control of the structural failure of aircraft or / and its citical systems resulted from design local control of the structural failure of aircraft or / and its citical systems resulted from design local control of the structural failure of aircraft or / and its citical systems resulted from design local control of the structural failure of aircraft or / and its citical systems resulted from design local control of the structural failure of aircraft or / and its citical systems resulted from design local control of the structural failure of aircraft or / and its citical systems resulted from design local control of the structural failure of aircraft or / and its citical systems resulted from design local control of the structural failure of aircraft or / and its citical systems resulted from design local control of the structural failure of aircraft or / and its citical systems resulted from design local control of the structural failure of aircraft or / and its citical systems resulted from design local control of the structural failure of aircraft or / and its citical systems resulted from design local control of the structural failure of aircraft or / and its citical systems resulted from the structural failure of aircraft or / and its citical systems resulted from the structural failure of aircraft or / and its citical systems resulted from the systems of aircraft or / and its citical systems resulted from the systems of aircraft or / and /	15				
	thrust reversers) Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown	49				
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26 AL19B72	Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing	168 448 6 32 245		32; 34; 35; 36; 38; 39;	54; 55; 56; 57; 58; 59
26 AL19B72	Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution	168 448 6 32 245 167		32; 34; 35; 36; 38; 39;	54; 55; 56; 57; 58; 59
26 AL19B72	Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	168 448 6 32 245 167 168		32; 34; 35; 36; 38; 39;	54; 55; 56; 57; 58; 59
26 AL19B72	Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of	168 448 6 32 245 167		32; 34; 35; 36; 38; 39;	54; 55; 56; 57; 58; 59
26 AL19B72	Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing	168 448 6 32 245 167 168 246		32; 34; 35; 36; 38; 39;	54; 55; 56; 57; 58; 59
26 AL19B72	Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures	168 448 6 32 245 167 168 246		32; 34; 35; 36; 38; 39;	54; 55; 56; 57; 58; 59
26 AL19B72	Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules	168 448 6 32 245 167 168 246 263 264		32; 34; 35; 36; 38; 39;	54; 55; 56; 57; 58; 59
26 AL19B72	Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS	168 448 6 32 245 167 168 246 263 264 269		32; 34; 35; 36; 38; 39;	47; 48; 50; 51; 52; 53; 54; 55; 56; 57; 58; 56; 61; 62; 63
26 AL19B72	Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety	168 448 6 32 245 167 168 246 263 264		32; 34; 35; 36; 38; 39;	54; 55; 56; 57; 58; 59
26 AL19B72	Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS	168 448 6 32 245 167 168 246 263 264 269		32; 34; 35; 36; 38; 39;	54; 55; 56; 57; 58; 59
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26 AL19B72	Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of	168 448 6 32 245 167 168 246 263 264 269 248		32; 34; 35; 36; 38; 39;	54; 55; 56; 57; 58; 5
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	Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 a	168 448 6 32 245 167 168 246 269 248 249 295 494 167 168 448 448 6 6 32	20; 21; 23; 24; 25	32; 34; 35; 36; 38; 39; 40; 42; 26; 27; 28; 29; 30; 31; 32; 34; 35; 36; 38; 39;	54; 55; 56; 57; 58; 5 60; 61; 62; 63 47; 48; 50; 51; 52; 5 54; 55; 56; 57; 58; 5
	Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution	494 167 168 448 6 32 245 167 168 246 264 269 248 249 295 494 167 168 448 6 32 245 167	20; 21; 23; 24; 25	32; 34; 35; 36; 38; 39; 40; 42; 26; 27; 28; 29; 30; 31; 32; 34; 35; 36; 38; 39;	54; 55; 56; 57; 58; 5 60; 61; 62; 63 47; 48; 50; 51; 52; 5 54; 55; 56; 57; 58; 5
	Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 a	168 448 6 32 245 167 168 246 269 248 249 295 494 167 168 448 448 6 6 32	20; 21; 23; 24; 25	32; 34; 35; 36; 38; 39; 40; 42; 26; 27; 28; 29; 30; 31; 32; 34; 35; 36; 38; 39;	54; 55; 56; 57; 58; 5 60; 61; 62; 63 47; 48; 50; 51; 52; 5 54; 55; 56; 57; 58; 5



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	Lack of adherence to the main CRM rules	264				
	Incorrect use of automation - FMS	269				
	Lack of adherence to the current technology standards in terms of flight safety	248				
	supporting systems. Lack of ILS on descent path	~				
_		249				
	Lack of adherence to SARPs included in Annex 14 and related documents in terms of	249				
	temporary suspension of operation on airport inthe case of adverse weather.	\perp				
	Lack of adherence to SARPs included in Annex 14 and related documents in terms of	295				
	RWY parameters and location, approach path parameters and obstacles locations.					
	Unintuitive and / or error prone system manual - FMS	494				
20 4140074		_		44 45 46 47 40 40	26 27 20 20 20 24	47 40 50 54 53 5
28 AL19B74	Pilot tiredness - Inadequate workload distribution	167		14; 15; 16; 17; 18; 19;	26; 27; 28; 29; 30; 31;	47; 48; 50; 51; 52; 5
				20; 21; 23; 24; 25	32; 34; 35; 36; 38; 39;	54; 55; 56; 57; 58; 5
					40; 42;	60; 61; 62; 63
	Flaws in pilot requirements definition process and/or training methodology	168				
_	Lack of adherence to emergency procedures	448				
		_				
	Adverse weather / poor visibility conditions / darkness	6				
	Convective weather / turbulence / windshear or crosswind conditions during take-off	32				
	Lack of adherence to SOP in terms of approach and landing	245				
	Pilot tiredness - Inadequate workload distribution	167				
		_				
	Flaws in pilot requirements definition process and/or training methodology	168				
	Lack of adherence to SOP in terms of briefing and checklist before initiating of	246				
	approach and landing					
	Flaws in CRM training procedures	263				
	Lack of adherence to the main CRM rules	264				
	Incorrect use of automation - FMS	269				
	Lack of adherence to the current technology standards in terms of flight safety	248				
	supporting systems. Lack of ILS on descent path					
	Lack of adherence to SARPs included in Annex 14 and related documents in terms of	249				
		249				
	temporary suspension of operation on airport inthe case of adverse weather.	\vdash			-	<u> </u>
	Lack of adherence to SARPs included in Annex 14 and related documents in terms of	295				
	RWY parameters and location, approach path parameters and obstacles locations.					
	Unintuitive and / or error prone system manual - FMS	494				
\/UI	1 1	434				+
VIII	Insufficient fuel available for next approach	1				
29 AL19B811	Continued unstabilized approach (failure to comply with go-around criteria and policy)	13		14; 15; 16; 17; 18; 19;	26; 27; 28; 29; 30; 31;	47; 48; 50; 51; 52; 5
				20; 21; 23; 24; 25	32; 34; 35; 36; 38; 39;	54; 55; 56; 57; 58; 5
					40; 42;	60; 61; 62; 63
	Lack of adherence to AIR OPS normal procedures in terms of missed approach	250			., ,	
		230				
	execution procedure	\perp				
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168				
	Adverse weather / poor visibility conditions / darkness	6				
		_				
	Convective weather / turbulence / windshear or crosswind conditions during take-off	32				
	Lack of adherence to SOP in terms of approach and landing	245				
		167				
	Pilot tiredness - Inadequate workload distribution	_				
	Flaws in pilot requirements definition process and/or training methodology	168				
	Lack of adherence to SOP in terms of briefing and checklist before initiating of	246				
	approach and landing					
		263				
	Flaws in CRM training procedures					
	Lack of adherence to the main CRM rules	264				
	Incorrect use of automation - FMS	269				
	Lack of adherence to the current technology standards in terms of flight safety	248				
	supporting systems. Lack of ILS on descent path	0				
	11 07	-				
	Lack of adherence to SARPs included in Annex 14 and related documents in terms of	249				
	temporary suspension of operation on airport inthe case of adverse weather.					
	Lack of adherence to SARPs included in Annex 14 and related documents in terms of	295				
		233				
	RWY parameters and location, approach path parameters and obstacles locations.	-				
	Unintuitive and / or error prone system manual - FMS	494				
	AOA prevents missed approach	14				
	Pilot tiredness - Inadequate workload distribution	167				
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	Flaws in pilot requirements definition process and/or training methodology	168			1	-
	Lack of adherence to AIR OPS normal procedures in terms of missed approach	250				
	execution procedure	L l			<u> </u>	<u> </u>
	Lack of adherence to emergency procedures	448				
	Go-around attempt after thrust reversers deployment	193				
20 414000424		_		14. 15. 10. 17. 10. 15	20, 27, 20, 20, 22, 21	47, 40, 50, 51, 52, 5
30 AL19B8121	Pilot tiredness - Inadequate workload distribution	167		14; 15; 16; 17; 18; 19;	26; 27; 28; 29; 30; 31;	47; 48; 50; 51; 52; 5
1				20; 21; 23; 24; 25	32; 34; 35; 36; 38; 39;	54; 55; 56; 57; 58; 5
					40; 42;	60; 61; 62; 63
	Territoria de la compansión de la compan	168				
	Flaws in pilot requirements definition process and/or training methodology	243			+	
	Flaws in pilot requirements definition process and/or training methodology				-	+
	Error in calculation of necessary amount of fuel	_	I			
	Error in calculation of necessary amount of fuel Lack of adherence to SOP in terms of necessary amount of fuel	254				
	Error in calculation of necessary amount of fuel	_				
	Error in calculation of necessary amount of fuel Lack of adherence to SOP in terms of necessary amount of fuel	254				
	Error in calculation of necessary amount of fuel Lack of adherence to SOP in terms of necessary amount of fuel Adverse weather / poor visibility conditions / darkness	254 6				
	Error in calculation of necessary amount of fuel Lack of adherence to SOP in terms of necessary amount of fuel Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off	254 6 32				
	Error in calculation of necessary amount of fuel Lack of adherence to SOP in terms of necessary amount of fuel Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing	254 6 32 245				
	Error in calculation of necessary amount of fuel Lack of adherence to SOP in terms of necessary amount of fuel Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off	254 6 32				
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	Error in calculation of necessary amount of fuel Lack of adherence to SOP in terms of necessary amount of fuel Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing	254 6 32 245 167 168 246				
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	Error in calculation of necessary amount of fuel Lack of adherence to SOP in terms of necessary amount of fuel Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules	254 6 32 245 167 168 246 263 264				
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	Error in calculation of necessary amount of fuel Lack of adherence to SOP in terms of necessary amount of fuel Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of	254 6 32 245 167 168 246 263 264 269				
	Error in calculation of necessary amount of fuel Lack of adherence to SOP in terms of necessary amount of fuel Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path	254 6 32 245 167 168 246 263 264 269 248				
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	Error in calculation of necessary amount of fuel Lack of adherence to SOP in terms of necessary amount of fuel Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.	254 6 32 245 167 168 246 263 264 269 248 249				
	Error in calculation of necessary amount of fuel Lack of adherence to SOP in terms of necessary amount of fuel Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Incorrect use of automation - FMS Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather. Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary manual of the proposed path parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS	254 6 32 245 167 168 246 269 248 249 295				
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		Flaws in pilot requirements definition process and/or training methodology	168				
		Lack of adherence to AIR OPS normal procedures in terms of missed approach	250				
		execution procedure					
_		Lack of adherence to emergency procedures	448				
21	AL19B8122	Go-around attempt after thrust reversers deployment	193 18		14; 15; 16; 17; 18; 19;	20, 27, 20, 20, 20, 21,	47; 48; 50; 51; 52; 53
31	AL19B8122	Convective weather encounter	18		20; 21; 23; 24; 25	26; 27; 28; 29; 30; 31; 32; 34; 35; 36; 38; 39; 40; 42;	54; 55; 56; 57; 58; 59 60; 61; 62; 63
		Missed approach execution necessary after prolonged flight due to e. g. extreme weather	44				
		Adverse weather / poor visibility conditions / darkness Convective weather / turbulence / windshear or crosswind conditions during take-off	6 32				
-		Lack of adherence to SOP in terms of approach and landing	245				
		Pilot tiredness - Inadequate workload distribution	167				
		Flaws in pilot requirements definition process and/or training methodology	168				
		Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing	246				
		Flaws in CRM training procedures	263				
		Lack of adherence to the main CRM rules	264				
		Incorrect use of automation - FMS	269				
		Lack of adherence to the current technology standards in terms of flight safety	248				
_		supporting systems. Lack of ILS on descent path					
		Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather.	249				
		Lack of adherence to SARPs included in Annex 14 and related documents in terms of	295				
\dashv		RWY parameters and location, approach path parameters and obstacles locations. Unintuitive and / or error prone system manual - FMS	494	 	+		
\dashv		AOA prevents missed approach	14		+		
		Pilot tiredness - Inadequate workload distribution	167	1	1		1
		Flaws in pilot requirements definition process and/or training methodology	168				
		Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure	250				
		Lack of adherence to emergency procedures	448				
		Go-around attempt after thrust reversers deployment	193				
32	AL19B82	System failure affecting the operation of primary instruments / displays or standby instruments	26		14; 15; 16; 17; 18; 19; 20; 21; 23; 24; 25	26; 27; 28; 29; 30; 31; 32; 34; 35; 36; 38; 39; 40; 42;	47; 48; 50; 51; 52; 5 54; 55; 56; 57; 58; 5 60; 61; 62; 63
		Pilot tiredness - Inadequate workload distribution	167			40, 42,	00, 01, 02, 03
		Flaws in pilot requirements definition process and/or training methodology	168				
		Adverse weather / poor visibility conditions / darkness	6				
		Adverse weather / poor visibility conditions / darkness	6				
		Convective weather / turbulence / windshear or crosswind conditions during take-off	32				
		Lack of adherence to SOP in terms of approach and landing	245				
_		Pilot tiredness - Inadequate workload distribution	167				
-		Flaws in pilot requirements definition process and/or training methodology	168 246			-	
		Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing	246				
		Flaws in CRM training procedures	263				
		Lack of adherence to the main CRM rules	264				
		Incorrect use of automation - FMS	269				
		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path	248				
		Lack of adherence to SARPs included in Annex 14 and related documents in terms of temporary suspension of operation on airport inthe case of adverse weather.	249				
		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.	295				
_		Unintuitive and / or error prone system manual - FMS	494	-	+	-	-
		AOA prevents missed approach	14				
		Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167	-			
\dashv		Lack of adherence to AIR OPS normal procedures in terms of missed approach	168 250	-	+		+
		execution procedure	230				
		Lack of adherence to emergency procedures	448				
		Go-around attempt after thrust reversers deployment	193				
23	Code	ldentifiable precursors		Technology	Human	Organisation	System of Organisations
\Box		Convective weather encounter	18				
[Frontal surface encounter	64				
		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles	225				
		locations (o.g. mountains)	1	1	The second secon	1	1
		locations (e.g. mountains).					
1	AL23B111	Flight crew fails to detect windshear	355		16: 23: 25	26: 36: 37: 39:	48: 50: 51: 54: 55:
1	AL23B111	Flight crew fails to detect windshear Lack of adherence to the current technology standards in terms of flight safety	355		16; 23; 25	26; 36; 37; 39;	48; 50; 51; 54; 55; 59; 60; 61; 62; 63
1	AL23B111	Flight crew fails to detect windshear	355 18		16; 23; 25	26; 36; 37; 39;	
1	AL23B111	Flight crew fails to detect windshear Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.			16; 23; 25	26; 36; 37; 39;	
1	AL23B111	Flight crew fails to detect windshear Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System. Convective weather encounter	18		16; 23; 25	26; 36; 37; 39;	
1	AL23B111	Flight crew fails to detect windshear Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System. Convective weather encounter Frontal surface encounter	18 64		16; 23; 25	26; 36; 37; 39;	
		Flight crew fails to detect windshear Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System. Convective weather encounter Frontal surface encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWV parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).	18 64 225				59; 60; 61; 62; 63
	AL23B111 AL23B112	Flight crew fails to detect windshear Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System. Convective weather encounter Frontal surface encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). Flaws in maintenance technician / airworthiness specialist requirements definition	18 64		16; 23; 25 16; 23; 25	26; 36; 37; 39; 26; 36; 37; 39;	59; 60; 61; 62; 63 48; 50; 51; 54; 55;
		Flight crew fails to detect windshear Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System. Convective weather encounter Frontal surface encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	18 64 225 149				59; 60; 61; 62; 63
		Flight crew fails to detect windshear Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System. Convective weather encounter Frontal surface encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	18 64 225 149				59; 60; 61; 62; 63 48; 50; 51; 54; 55;
		Flight crew fails to detect windshear Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System. Convective weather encounter Frontal surface encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification	18 64 225 149				59; 60; 61; 62; 63 48; 50; 51; 54; 55; 55
		Flight crew fails to detect windshear Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System. Convective weather encounter Frontal surface encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	18 64 225 149				48; 50; 51; 54; 55; 5



	precursors ar	10 SPI	S			safety certif
	Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).	225				
3 AL23B113	Traffic controller tiredness - Inadequate workload distribution	137		16; 23; 25	26; 36; 37; 39;	48; 50; 51; 54; 55; 58
	Flaws in traffic controller requirements definition process and/or training methodology	145				59; 60; 61; 62; 63
	Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on	214				
	windshear appeared Convective weather encounter	18				
	Frontal surface encounter	64				
	Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles	225				
	locations (e.g. mountains).					
4 AL23B121	Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System.	215		16; 23; 25	26; 36; 37; 39;	48; 50; 51; 54; 55; 58 59; 60; 61; 62; 63
	Convective weather encounter	18				33, 00, 01, 02, 03
	Frontal surface encounter	64				
	Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).	225				
5 AL23B122	System failure affecting the operation of primary instruments / displays or standby instruments	26		16; 23; 25	26; 36; 37; 39;	48; 50; 51; 54; 55; 5 59; 60; 61; 62; 63
	Flaws in maintenance technician / airworthiness specialist requirements definition	149				33, 66, 61, 62, 63
	process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
	distribution	130				
	Inadequate certification process and / or flaws in methodology concerning verification	253				
	of the system / product compliance with requirements - PWS system Flaws in manufacturer quality control process - PWS system components	298				
	Convective weather encounter	18				
	Frontal surface encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of	64 225				
	RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).	225				
6 AL23B13	Pilot tiredness - Inadequate workload distribution	167	·	16; 23; 25	26; 36; 37; 39;	48; 50; 51; 54; 55; 5 59; 60; 61; 62; 63
	Flaws in pilot requirements definition process and/or training methodology	168				50,00,00,00,00
	Convective weather encounter	18 64				
	Frontal surface encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of	225				
	RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).					
II	Flight crew fails to execute WEM successfully					
7 AL23B21	not identifiable at that level			16; 23; 25	26; 36; 37; 39;	48; 50; 51; 54; 55; 5 59; 60; 61; 62; 63
	Convective weather encounter	18				
	Frontal surface encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of	64 225				
	RWY parameters and location, attitude, approach path parameters and obstacles	223				
	locations (e.g. mountains).					
	System failure affecting the operation of primary instruments / displays or standby instruments	26				
	Traffic controller tiredness - Inadequate workload distribution	137				
	Flaws in traffic controller requirements definition process and/or training methodology	145				
	Flaws in maintenance technician / airworthiness specialist requirements definition	149				
	process and/or training methodology	450				
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150				
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on	168 214				
	windshear appeared	214				
	Lack of adherence to the current technology standards in terms of flight safety	215				
	supporting systems. Lack of PWS System. Inadequate certification process and / or flaws in methodology concerning verification	253				
	of the system / product compliance with requirements - PWS system					
	Flaws in manufacturer quality control process - PWS system components Lack of adherence to the current technology standards in terms of flight safety	298 355				
	supporting systems. Lack of LLWAS System.	333	İ			
	Inadequate certification process and / or flaws in methodology concerning verification	356	1			
8 AL23B221	of the system / product compliance with requirements - LLWAS system Convective weather / turbulence / windshear encounter conditions during landing	65		16; 23; 25	26; 36; 37; 39;	48; 50; 51; 54; 55; 5 59; 60; 61; 62; 63
	Convective weather encounter	18				33, 00, 01, 02, 03
	Frontal surface encounter	64				
	Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).	225				
	locations (e.g. mountains). System failure affecting the operation of primary instruments / displays or standby instruments	26				
	Traffic controller tiredness - Inadequate workload distribution	137				
	Flaws in traffic controller requirements definition process and/or training methodology					
1		149				+
	Flaws in maintenance technician / airworthiness specialist requirements definition	1-10		1		
	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology					
	process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
	process and/or training methodology	150 167				



		precursors ar	10 SP	is		`	safety certific
		Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on	214				
		windshear appeared					
		Lack of adherence to the current technology standards in terms of flight safety	215				
		supporting systems. Lack of PWS System.					
		Inadequate certification process and / or flaws in methodology concerning verification	253				
		of the system / product compliance with requirements - PWS system					
		Flaws in manufacturer quality control process - PWS system components	298				
		Lack of adherence to the current technology standards in terms of flight safety	355				
		supporting systems. Lack of LLWAS System.	356				
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - LLWAS system	350				
٥	AL23B222	Pilot tiredness - Inadequate workload distribution	167		16; 23; 25	26; 36; 37; 39;	48; 50; 51; 54; 55; 58;
9	ALZSBZZZ	rilot tirediless - illadequate workload distribution	107		10, 23, 23	20, 30, 37, 39,	59; 60; 61; 62; 63
		Flaws in pilot requirements definition process and/or training methodology	168				33, 00, 01, 02, 03
		Lack of adherence to emergency procedures - WEM	173				
		Convective weather encounter	18				
		Frontal surface encounter	64				
		Lack of adherence to SARPs included in Annex 14 and related documents in terms of	225				
		RWY parameters and location, attitude, approach path parameters and obstacles					
		locations (e.g. mountains).					
		System failure affecting the operation of primary instruments / displays or standby	26				
		instruments					
		Traffic controller tiredness - Inadequate workload distribution	137				
		Flaws in traffic controller requirements definition process and/or training methodology	145				
		Flaws in maintenance technician / airworthiness specialist requirements definition	149				
		process and/or training methodology					
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
		distribution					
		Pilot tiredness - Inadequate workload distribution	167				
		Flaws in pilot requirements definition process and/or training methodology	168				
		Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on	214			1	
		windshear appeared	-				
		Lack of adherence to the current technology standards in terms of flight safety	215			1	
		supporting systems. Lack of PWS System.					
		Inadequate certification process and / or flaws in methodology concerning verification	253				
		of the system / product compliance with requirements - PWS system					
		Flaws in manufacturer quality control process - PWS system components	298				
		Lack of adherence to the current technology standards in terms of flight safety	355				
		supporting systems. Lack of LLWAS System. Inadequate certification process and / or flaws in methodology concerning verification	356				
		of the system / product compliance with requirements - LLWAS system	330				
Ш		Structural failure	-				
	AL23B31	Flaws in maintenance technician / airworthiness specialist requirements definition	149	7.	16; 23; 25	26; 36; 37; 39;	48; 50; 51; 54; 55; 58
10	ALZ3B31	process and/or training methodology	149	<i>'</i> ,	10, 23, 23	20, 30, 37, 39,	59; 60; 61; 62; 63
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				33, 00, 01, 02, 03
		distribution	130				
		Inadequate certification process and / or flaws in methodology concerning verification	358				
		of the system / product compliance with requirements - Landing gear components					
		, , , , , , , , , , , , , , , , , , ,					
		Flaws in aircraft system maintenance process definition - Landing gear components.	377				
		Flaws in manufacturer quality control process - Landing gear components.	376				
		Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess	116				
		of applicable limit(s), either intentionally or unknowingly					
		Hard landing	47				
		Bounced landing	118				
		High energy approach due to lack of adequate planning or due to challenging design of	413				
		STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent,					
		vectors, altitude or speed restrictions,)	_				
		Late deceleration and configuration set-up for approach and landing	414				
		DME / ILS DME confusion in assessing the final descent point / FAF	415				
		Unstabilized final approach (high, fast, steep,)	416				
		Tailwind component above limit	417				
		Convective weather encounter	18				
		Frontal surface encounter	64				
	I		225		I		
		Lack of adherence to SARPs included in Annex 14 and related documents in terms of	1				l .
		RWY parameters and location, attitude, approach path parameters and obstacles					
		RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).	2.0				
		RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). System failure affecting the operation of primary instruments / displays or standby	26				
		RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). System failure affecting the operation of primary instruments / displays or standby instruments					
		RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). System failure affecting the operation of primary instruments / displays or standby instruments Traffic controller tiredness - Inadequate workload distribution	137				
		RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). System failure affecting the operation of primary instruments / displays or standby instruments					
		RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). System failure affecting the operation of primary instruments / displays or standby instruments Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology	137 145				
		RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). System failure affecting the operation of primary instruments / displays or standby instruments Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Flaws in maintenance technician / airworthiness specialist requirements definition	137				
		RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). System failure affecting the operation of primary instruments / displays or standby instruments Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	137 145 149				
		RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). System failure affecting the operation of primary instruments / displays or standby instruments Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	137 145				
		RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). System failure affecting the operation of primary instruments / displays or standby instruments Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	137 145 149 150				
		RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). System failure affecting the operation of primary instruments / displays or standby instruments Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Pilot tiredness - Inadequate workload distribution	137 145 149 150				
		RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). System failure affecting the operation of primary instruments / displays or standby instruments Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Flows in pilot requirements definition process and/or training methodology	137 145 149 150				
		RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). System failure affecting the operation of primary instruments / displays or standby instruments Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on	137 145 149 150 167 168				
		RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). System failure affecting the operation of primary instruments / displays or standby instruments Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared	137 145 149 150 167 168				
		RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). System failure affecting the operation of primary instruments / displays or standby instruments Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared Lack of adherence to the current technology standards in terms of flight safety	137 145 149 150 167 168 214				
		RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). System failure affecting the operation of primary instruments / displays or standby instruments Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared	137 145 149 150 167 168 214				
		RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). System failure affecting the operation of primary instruments / displays or standby instruments Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System.	137 145 149 150 167 168 214				
		RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). System failure affecting the operation of primary instruments / displays or standby instruments Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System. Inadequate certification process and / or flaws in methodology concerning verification	137 145 149 150 167 168 214				
		RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). System failure affecting the operation of primary instruments / displays or standby instruments Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system Flaws in manufacturer quality control process - PWS system components	137 145 149 150 167 168 214 215				
		RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). System failure affecting the operation of primary instruments / displays or standby instruments Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system	137 145 149 150 167 168 214 215 253				
		RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). System failure affecting the operation of primary instruments / displays or standby instruments Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system Flaws in manufacturer quality control process - PWS system components Lack of adherence to the current technology standards in terms of flight safety	137 145 149 150 167 168 214 215 253				
		RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). System failure affecting the operation of primary instruments / displays or standby instruments Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system Flaws in manufacturer quality control process - PWS system components Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.	137 145 149 150 167 168 214 215 253 298 355				



_	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168				
44 4122022	Lack of adherence to emergency procedures - WEM	173	-	46 22 25	26 26 27 20	40 50 54 54 55 5
11 AL23B32	Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess	116	7;	16; 23; 25	26; 36; 37; 39;	48; 50; 51; 54; 55; 5
_	of applicable limit(s), either intentionally or unknowingly	251				59; 60; 61; 62; 63
	Lack of adherence to AFM limitations for landing	47				
+	Hard landing	118				+
_	Bounced landing	_				
	High energy approach due to lack of adequate planning or due to challenging design of	413				
	STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,)					
_	Late deceleration and configuration set-up for approach and landing	414				
+		_				+
_	DME / ILS DME confusion in assessing the final descent point / FAF	415 416				
_	Unstabilized final approach (high, fast, steep,) Tailwind component above limit	417				
_	Convective weather encounter	18				
_	Frontal surface encounter	64				
_	Lack of adherence to SARPs included in Annex 14 and related documents in terms of	225				_
	RWY parameters and location, attitude, approach path parameters and obstacles	223				
	locations (e.g. mountains).					
	System failure affecting the operation of primary instruments / displays or standby	26				+
	instruments	20				
+	Traffic controller tiredness - Inadequate workload distribution	137				+
+	Flaws in traffic controller requirements definition process and/or training methodology	145				+
		143				
+	Flaws in maintenance technician / airworthiness specialist requirements definition	149				1
	process and/or training methodology	143				
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
	distribution	130				
	Pilot tiredness - Inadequate workload distribution	167		1		1
+	Flaws in pilot requirements definition process and/or training methodology	168				+
	Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on	214				
1	windshear appeared				1	1
	Lack of adherence to the current technology standards in terms of flight safety	215				1
	supporting systems. Lack of PWS System.					
	Inadequate certification process and / or flaws in methodology concerning verification	253				1
	of the system / product compliance with requirements - PWS system	233				
	Flaws in manufacturer quality control process - PWS system components	298				
	Lack of adherence to the current technology standards in terms of flight safety	355				
	supporting systems. Lack of LLWAS System.	333				
	Inadequate certification process and / or flaws in methodology concerning verification	356				
	of the system / product compliance with requirements - LLWAS system	330				
	Convective weather / turbulence / windshear encounter conditions during landing	65				
	Pilot tiredness - Inadequate workload distribution	_				
+		167				
	Flaws in pilot requirements definition process and/or training methodology	168				
IV	Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM	_				
IV 12 AL23B41	Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Flight crew fails to maintain control	168	7:	16: 23: 25	26: 36: 37: 39:	48: 50: 51: 54: 55:
IV 12 AL23B41	Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM	168	7;	16; 23; 25	26; 36; 37; 39;	
	Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Flight crew fails to maintain control not identifiable at that level	168 173	7;	16; 23; 25	26; 36; 37; 39;	48; 50; 51; 54; 55; 59; 60; 61; 62; 63
	Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Flight crew fails to maintain control not identifiable at that level Convective weather encounter	168 173 18	7;	16; 23; 25	26; 36; 37; 39;	
	Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Flight crew fails to maintain control not identifiable at that level Convective weather encounter Frontal surface encounter	168 173 18 64	7;	16; 23; 25	26; 36; 37; 39;	
	Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Flight crew fails to maintain control not identifiable at that level Convective weather encounter Frontal surface encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of	168 173 18	7;	16; 23; 25	26; 36; 37; 39;	
	Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Flight crew fails to maintain control not identifiable at that level Convective weather encounter Frontal surface encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles	168 173 18 64	7;	16; 23; 25	26; 36; 37; 39;	
	Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Flight crew fails to maintain control not identifiable at that level Convective weather encounter Frontal surface encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).	168 173 18 64 225	7;	16; 23; 25	26; 36; 37; 39;	
_	Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Flight crew fails to maintain control not identifiable at that level Convective weather encounter Frontal surface encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountrains). System failure affecting the operation of primary instruments / displays or standby	168 173 18 64	7;	16; 23; 25	26; 36; 37; 39;	
	Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Flight crew fails to maintain control not identifiable at that level Convective weather encounter Frontal surface encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). System failure affecting the operation of primary instruments / displays or standby instruments	168 173 18 64 225	7;	16; 23; 25	26; 36; 37; 39;	
	Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Flight crew fails to maintain control not identifiable at that level Convective weather encounter Frontal surface encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). System failure affecting the operation of primary instruments / displays or standby instruments Traffic controller tiredness - Inadequate workload distribution	168 173 18 64 225 26	7;	16; 23; 25	26; 36; 37; 39;	
	Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Flight crew fails to maintain control not identifiable at that level Convective weather encounter Frontal surface encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). System failure affecting the operation of primary instruments / displays or standby instruments	168 173 18 64 225	7;	16; 23; 25	26; 36; 37; 39;	
	Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Flight crew fails to maintain control not identifiable at that level Convective weather encounter Frontal surface encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). System failure affecting the operation of primary instruments / displays or standby instruments Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology	168 173 18 64 225 26 137 145	7;	16; 23; 25	26; 36; 37; 39;	
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	Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Flight crew fails to maintain control not identifiable at that level Convective weather encounter Frontal surface encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). System failure affecting the operation of primary instruments / displays or standby instruments Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Flot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system Flaws in manufacturer quality control process - PWS system components Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system Convective weather / turbulence / windshear encounter conditions during landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/ or flaws in methodology concerning verification of the system / product compliance with requirements - LLWAS system Con	168 173 18 64 225 26 137 145 149 150 214 215 253 298 355 65 167 167 168 173 116	7;	16; 23; 25	26; 36; 37; 39;	
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	process and/or training methodology					
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150				
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	Flaws in manufacturer quality control process - Landing gear components.	376				
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13 AL23B42	Pilot tiredness - Inadequate workload distribution	167	7;	16; 23; 25	26; 36; 37; 39;	59; 60; 61; 62; 63
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	Frontal surface encounter	64				
	Lack of adherence to SARPs included in Annex 14 and related documents in terms of	225				
	RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).					
	System failure affecting the operation of primary instruments / displays or standby instruments	26				
	Traffic controller tiredness - Inadequate workload distribution	137				
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	Lack of adherence to emergency procedures - WEM	173				
	Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess	116				
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	Hard landing Bounced landing	118				
	High energy approach due to lack of adequate planning or due to challenging design of	413				
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	Convective weather encounter Frontal surface encounter	18 64		1		
	Lack of adherence to SARPs included in Annex 14 and related documents in terms of	225		+		+
	RWY parameters and location, attitude, approach path parameters and obstacles					
	locations (e.g. mountains). System failure affecting the operation of primary instruments / displays or standby	26		+		+
	instruments					
	Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology	137 145		+		
	Flaws in maintenance technician / airworthiness specialist requirements definition	149		-		
	process and/or training methodology					
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
	distribution Pilot tiredness - Inadequate workload distribution	167		-		+
	prince an earness i madequate workload distribution		 	+	+	
	Flaws in pilot requirements definition process and/or training methodology	168				
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	Inadequate certification process and / or flaws in methodology concerning verification	253				
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	Lack of adherence to emergency procedures - WEM	116				
	Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess	116				
	of applicable limit(s), either intentionally or unknowingly	47				
	Hard landing	47 118				
	Bounced landing	413				
	High energy approach due to lack of adequate planning or due to challenging design of	413				
	STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent,					
	vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing	414				
	DME / ILS DME confusion in assessing the final descent point / FAF	415				
		416			+	
	Unstabilized final approach (high, fast, steep,) Tailwind component above limit	417				
	Inadequate certification process and / or flaws in methodology concerning verification	358				
		336				
	of the system / product compliance with requirements - Landing gear components					
	Clave in maintenance technician / airworthings specialist sequirements deficitive	140	-		+	
	Flaws in maintenance technician / airworthiness specialist requirements definition	149	1		1	
	process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150	 	+	+	+
		130	1		1	
	distribution	377	 		+	
	Flaws in aircraft system maintenance process definition - Landing gear components.	376	 		+	
	Flaws in manufacturer quality control process - Landing gear components.	251	 	-	+	
15 AL 22D 44	Lack of adherence to AFM limitations for landing	_	7.	16, 22, 25	26, 26, 27, 20,	19:50:51:54:55:
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		_			-	
	Convective weather encounter	18				
	Frontal surface encounter	64			-	
	Lack of adherence to SARPs included in Annex 14 and related documents in terms of	225				
	RWY parameters and location, attitude, approach path parameters and obstacles					
	locations (e.g. mountains).	26				
	System failure affecting the operation of primary instruments / displays or standby	26				
	instruments					
	Traffic controller tiredness - Inadequate workload distribution	137				
	Flaws in traffic controller requirements definition process and/or training methodology	145				
	Flaws in maintenance technician / airworthiness specialist requirements definition	149				
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	Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
	distribution					
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	supporting systems. Lack of PWS System.					
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	Convective weather / turbulence / windshear encounter conditions during landing	65				
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168				
	Lack of adherence to emergency procedures - WEM	173				
	Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess	116				
	of applicable limit(s), either intentionally or unknowingly	\perp			<u> </u>	
	Hard landing	47				
	Bounced landing	118				
	High energy approach due to lack of adequate planning or due to challenging design of	413				
	STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent,		1		1	
	vectors, altitude or speed restrictions,)		1		1	
	Late deceleration and configuration set-up for approach and landing	414				
	DME / ILS DME confusion in assessing the final descent point / FAF	415				
	Unstabilized final approach (high, fast, steep,)	416				
	Tailwind component above limit	417				
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	of the system / product compliance with requirements - Landing gear components	1	1		1	
	, , , , , , , , , , , , , , , , , , , ,		1		1	
	Flaws in maintenance technician / airworthiness specialist requirements definition	149			1	
	process and/or training methodology	143	1		1	
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150			+	
I	maniferrance technician / an worthiness specialist theuness - madequate WORROAD	130	1		1	
	distribution			+	+	
	distribution	277			The second secon	1
	Flaws in aircraft system maintenance process definition - Landing gear components.	377			+	<u> </u>
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		Pilot tiredness - Inadequate workload distribution	167				
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		Descent above desired descent profile	412				
		High energy approach due to lack of adequate planning or due to challenging design of	413				
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		vectors, altitude or speed restrictions,)					
		Late deceleration and configuration set-up for approach and landing	414				
		DME / ILS DME confusion in assessing the final descent point / FAF	415				
		Unstabilized final approach (high, fast, steep,)	416				
		Tailwind component above limit	417				
		Convective weather encounter	18			+	
			_				
		Frontal surface encounter	64				
		Lack of adherence to SARPs included in Annex 14 and related documents in terms of	225				
		RWY parameters and location, attitude, approach path parameters and obstacles					
		locations (e.g. mountains).					
		System failure affecting the operation of primary instruments / displays or standby	26				
		instruments					
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		Traffic controller tiredness - Inadequate workload distribution	137				
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		Flaws in maintenance technician / airworthiness specialist requirements definition	149				
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-		distribution			 	1	
		Pilot tiredness - Inadequate workload distribution	167				
T		Flaws in pilot requirements definition process and/or training methodology	168				
		Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on	214				
		windshear appeared			1		
		Lack of adherence to the current technology standards in terms of flight safety	215		 		
			213		1		
-		supporting systems. Lack of PWS System.	0.5.5			1	
		Inadequate certification process and / or flaws in methodology concerning verification	253				
		of the system / product compliance with requirements - PWS system					
		Flaws in manufacturer quality control process - PWS system components	298				
		Lack of adherence to the current technology standards in terms of flight safety	355				
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		Inadequate certification process and / or flaws in methodology concerning verification	356				
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17 A	L23B52	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM	167 168 173	7; 9;	16; 23; 24; 25	26; 36; 37; 39;	48; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
17 A	.L23B52	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM	167 168 173	7; 9;	16; 23; 24; 25	26; 36; 37; 39;	
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17 A	iL23B52	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Hard landing System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)	167 168 173 47	7; 9;	16; 23; 24; 25	26; 36; 37; 39;	
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17 A	.L23B52	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Hard landing System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	167 168 173 47 15	7; 9;	16; 23; 24; 25	26; 36; 37; 39;	
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17 Al	L23B52	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Hard landing System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	167 168 173 47 15	7; 9;	16; 23; 24; 25	26; 36; 37; 39;	
17 A	L23B52	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Hard landing System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	167 168 173 47 15 149	7; 9;	16; 23; 24; 25	26; 36; 37; 39;	
17 Al	.L23B52	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Hard landing System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Severe structural failure of aircraft or / and its critical systems resulted from design load	167 168 173 47 15 149	7; 9;	16; 23; 24; 25	26; 36; 37; 39;	
17 Al	L23B52	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Hard landing System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown	167 168 173 47 15 149 150	7; 9;	16; 23; 24; 25	26; 36; 37; 39;	
17 A	L23B52	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Hard landing System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown Bounced landing	167 168 173 47 15 149 150 49	7; 9;	16; 23; 24; 25	26; 36; 37; 39;	
17 Al	L23B52	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Hard landing System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown Bounced landing Deep (long landing	167 168 173 47 15 149 150 49 118 119	7; 9;	16; 23; 24; 25	26; 36; 37; 39;	
17 Al	L23B52	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Hard landing System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown Bounced landing	167 168 173 47 15 149 150 49	7; 9;	16; 23; 24; 25	26; 36; 37; 39;	
17 A	L23852	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Hard landing System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown Bounced landing Deep (long landing	167 168 173 47 15 149 150 49 118 119	7; 9;	16; 23; 24; 25	26; 36; 37; 39;	
17 A	L23B52	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Hard landing System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown Bounced landing Deep (long) landing Decsent above desired descent profile High energy approach due to lack of adequate planning or due to challenging design of	167 168 173 47 15 149 150 49 118 119	7; 9;	16; 23; 24; 25	26; 36; 37; 39;	
17 A	L23B52	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Hard landing System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown Bounced landing Deep (long) landing Deecent above desired descent profile High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent,	167 168 173 47 15 149 150 49 118 119	7; 9;	16; 23; 24; 25	26; 36; 37; 39;	
17 Al	L23B52	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Hard landing System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown Bounced landing Deep (long) landing Deep (long) landing Descent above desired descent profile High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,)	167 168 173 47 15 149 150 49 118 119 412 413	7; 9;	16; 23; 24; 25	26; 36; 37; 39;	
17 Al	L23B52	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Hard landing System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown Bounced landing Deep (long) landing Deep (long) landing Descent above desired descent profile High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing	167 168 173 47 15 149 150 49 118 119 412 413	7; 9;	16; 23; 24; 25	26; 36; 37; 39;	
17 Al	L23852	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Hard landing System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown Bounced landing Deep (long) landing Descent above desired descent profile High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) DME / ILS DME confusion in assessing the final descent point / FAF	167 168 173 47 15 149 150 49 118 119 412 413	7; 9;	16; 23; 24; 25	26; 36; 37; 39;	
17 A	L23B52	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Hard landing System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown Bounced landing Deep (long) landing Deep (long) landing Dees (long) landing Dees (long) landing Descent above desired descent profile High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing DME / ILS DME confusion in assessing the final descent point / FAF Unstabilized final approach (high, fast, steep,)	167 168 173 47 15 15 149 150 49 118 119 412 413 414 415 416	7; 9;	16; 23; 24; 25	26; 36; 37; 39;	
17 A	.1.23852	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Hard landing System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown Bounced landing Deep (long) landing Descent above desired descent profile High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) DME / ILS DME confusion in assessing the final descent point / FAF	167 168 173 47 15 149 150 49 118 119 412 413	7; 9;	16; 23; 24; 25	26; 36; 37; 39;	
17 A	L23B52	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Hard landing System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown Bounced landing Deep (long) landing Deep (long) landing Descent above desired descent profile High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing DME / LIS DME confusion in assessing the final descent point / FAF Unstabilized final approach (high, fast, steep,) Tailwind component above limit	167 168 173 47 15 15 149 150 49 118 119 412 413 414 415 416	7; 9;	16; 23; 24; 25	26; 36; 37; 39;	
17 A	L23B52	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Hard landing System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown Bounced landing Deep (long) landing Deep (long) landing Descent above desired descent profile High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing DME / ILS DME confusion in assessing the final descent point / FAF Unstabilized final approach (high, fast, steep,) Tailwind component above limit Convective weather encounter	167 168 173 47 15 149 150 49 118 411 413 414 415 416 417 18	7; 9;	16; 23; 24; 25	26; 36; 37; 39;	
17 A	.1.23852	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Hard landing System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown Bounced landing Deep (long) landing Deecent above desired descent profile High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing DME / ILS DME confusion in assessing the final descent point / FAF Unstabilized final approach (high, fast, steep,) Tailwind component above limit Convective weather encounter Frontal surface encounter	167 168 173 47 15 150 150 49 118 119 412 413 414 415 416 417 18	7; 9;	16; 23; 24; 25	26; 36; 37; 39;	
17 A	1123852	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Hard landing System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown Bounced landing Deep (long) landing Deep (long) landing Dees (long) landing Descent above desired descent profile High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing DME / ILS DME confusion in assessing the final descent point / FAF Unstabilized final approach (high, fast, steep,) Tailwind component above limit Convective weather encounter Frontal surface encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of	167 168 173 47 15 149 150 49 118 411 413 414 415 416 417 18	7; 9;	16; 23; 24; 25	26; 36; 37; 39;	
17 A	.1.23852	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Hard landing System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown Bounced landing Deep (long) landing Deep (long) landing Descent above desired descent profile High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing DME / ILS DME confusion in assessing the final descent point / FAF Unstabilized final approach (high, fast, steep,) Tailwind component above limit Convective weather encounter Frontal surface encounter Frontal surface encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles	167 168 173 47 15 150 150 49 118 119 412 413 414 415 416 417 18	7; 9;	16; 23; 24; 25	26; 36; 37; 39;	
17 A	.1.23852	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Hard landing System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist triedness - Inadequate workload distribution Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown Bounced landing Deep (long) landing Deecent above desired descent profile High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing DME / ILS DME confusion in assessing the final descent point / FAF Unstabilized final approach (high, fast, steep,) Tailwind component above limit Convective weather encounter Frontal surface encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).	167 168 173 47 15 149 150 49 118 411 413 414 415 416 417 417 418 64 225	7; 9;	16; 23; 24; 25	26; 36; 37; 39;	
17 A	1123B52	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Hard landing System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown Bounced landing Deep (long) landing Deep (long) landing Descent above desired descent profile High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing DME / ILS DME confusion in assessing the final descent point / FAF Unstabilized final approach (high, fast, steep,) Tailwind component above limit Convective weather encounter Frontal surface encounter Frontal surface encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles	167 168 173 47 15 150 150 49 118 119 412 413 414 415 416 417 18	7; 9;	16; 23; 24; 25	26; 36; 37; 39;	
17 A	.1.23852	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Hard landing System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown Bounced landing Deep (long) landing Deep (long) landing Descent above desired descent profile High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing DME / ILS DME confusion in assessing the final descent point / FAF Unstabilized final approach (high, fast, steep,) Tailwind component above limit Convective weather encounter Frontal surface encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). System failure affecting the operation of primary instruments / displays or standby	167 168 173 47 15 149 150 49 118 411 413 414 415 416 417 417 418 64 225	7; 9;	16; 23; 24; 25	26; 36; 37; 39;	
17 A	1123852	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Hard landing System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tredness - Inadequate workload distribution Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown Bounced landing Deep (long) landing Deep (long) landing Descent above desired descent profile High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing DME / ILS DME confusion in assessing the final descent point / FAF Unstabilized final approach (high, fast, steep,) Tailwind component above limit Convective weather encounter Frontal surface encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). System failure affecting the operation of primary instruments / displays or standby instruments	167 168 173 47 15 149 150 49 118 119 412 413 414 415 416 417 18 64 225	7; 9;	16; 23; 24; 25	26; 36; 37; 39;	
17 A	1123852	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Hard landing System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown Bounced landing Deep (long) landing Deep (long) landing Descent above desired descent profile High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing DME / ILS DME confusion in assessing the final descent point / FAF Unstabilized final approach (high, fast, steep,) Tailwind component above limit Convective weather encounter Frontal surface encounter Frontal surface encounter Frontal surface encounter Frontal surface encounter Frontal surface encounter Frontal surface encounter Frontal surface encounter Frontal surface encounter Solvential surface encounter Frontal surface encounter Frontal surface encounter Frontal surface encounter Frontal surface encounter Frontal surface encounter Frontal surface encounter Frontal surface encounter Frontal surface encounter Frontal surface encounter Frontal surface encounter Frontal surface encounter Frontal surface encounter Frontal surface encounter Frontal surface encounter Frontal surface encounter Frontal surface encounter	167 168 173 47 15 149 150 49 118 119 412 413 414 415 416 417 18 64 225	7; 9;	16; 23; 24; 25	26; 36; 37; 39;	
17 A	1.123852	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Hard landing System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tredness - Inadequate workload distribution Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown Bounced landing Deep (long) landing Deep (long) landing Descent above desired descent profile High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing DME / ILS DME confusion in assessing the final descent point / FAF Unstabilized final approach (high, fast, steep,) Tailwind component above limit Convective weather encounter Frontal surface encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). System failure affecting the operation of primary instruments / displays or standby instruments	167 168 173 47 15 149 150 49 118 119 412 413 414 415 416 417 18 64 225	7; 9;	16; 23; 24; 25	26; 36; 37; 39;	
17 A	1123852	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Hard landing System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown Bounced landing Deep (long) landing Deep (long) landing Dees (long) landing Descent above desired descent profile High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing DME / ILS DME confusion in assessing the final descent point / FAF Unstabilized final approach (high, fast, steep,) Tailwind component above limit Convective weather encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). System failure affecting the operation of primary instruments / displays or standby instruments Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology	167 168 173 47 15 15 149 150 49 118 411 413 414 415 416 417 18 64 225 26	7; 9;	16; 23; 24; 25	26; 36; 37; 39;	
17 A	.1.23852	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Hard landing System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown Bounced landing Deep (long) landing Deep (long) landing Descent above desired descent profile High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing DME / ILS DME confusion in assessing the final descent point / FAF Unstabilized final approach (high, fast, steep,) Tailwind component above limit Convective weather encounter Frontal surface encounter Frontal surface encounter Frontal surface encounter Frontal surface encounter Frontal surface encounter Frontal surface encounter Frontal surface encounter Frontal surface encounter Solvential surface encounter Frontal surface encounter Frontal surface encounter Frontal surface encounter Frontal surface encounter Frontal surface encounter Frontal surface encounter Frontal surface encounter Frontal surface encounter Frontal surface encounter Frontal surface encounter Frontal surface encounter Frontal surface encounter Frontal surface encounter Frontal surface encounter Frontal surface encounter Frontal surface encounter	167 168 173 47 15 149 150 49 118 119 412 413 414 415 416 417 18 64 225	7; 9;	16; 23; 24; 25	26; 36; 37; 39;	
17 A	1123852	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Hard landing System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown Bounced landing Deep (long) landing Deep (long) landing Dees (long) landing Descent above desired descent profile High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing DME / ILS DME confusion in assessing the final descent point / FAF Unstabilized final approach (high, fast, steep,) Tailwind component above limit Convective weather encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). System failure affecting the operation of primary instruments / displays or standby instruments Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology	167 168 173 47 15 15 149 150 49 118 411 413 414 415 416 417 18 64 225 26	7; 9;	16; 23; 24; 25	26; 36; 37; 39;	
17 A	1123852	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Hard landing System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist triedness - Inadequate workload distribution Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown Bounced landing Deep (long) landing Deep (long) landing Descent above desired descent profile High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing DME / ILS DME confusion in assessing the final descent point / FAF Unstabilized final approach (high, fast, steep,) Tailwind component above limit Convective weather encounter Frontal surface encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). System failure affecting the operation of primary instruments / displays or standby instruments Traffic controller tredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology	167 168 173 47 15 149 150 49 49 412 413 414 415 416 417 18 64 225 26	7; 9;	16; 23; 24; 25	26; 36; 37; 39;	
17 A	1.123852	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Hard landing System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown Bounced landing Deep (long) landing Deep (long) landing Descent above desired descent profile High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing DME / ILS DME confusion in assessing the final descent point / FAF Unstabilized final approach (high, fast, steep,) Tailwind component above limit Convective weather encounter Frontal surface encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g., mountains). System failure affecting the operation of primary instruments / displays or standby instruments Traffic controller tredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tredness - Inadequate workload	167 168 173 47 15 15 149 150 49 118 411 413 414 415 416 417 18 64 225 26	7; 9;	16; 23; 24; 25	26; 36; 37; 39;	
17 A	1123852	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Hard landing System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown Bounced landing Deep (long) landing Deep (long) landing Dees (long) landing Descent above desired descent profile High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing DME / ILS DME confusion in assessing the final descent point / FAF Unstabilized final approach (high, fast, steep,) Tailwind component above limit Convective weather encounter Frontal surface encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). System failure affecting the operation of primary instruments / displays or standby instruments Traffic controller tiredness - Inadequate workload distribution Flaws in maintenance technician / airworthiness specialist trequirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	167 168 173 47 15 149 150 49 1118 1412 413 414 415 416 417 18 64 225 26 137 149	7; 9;	16; 23; 24; 25	26; 36; 37; 39;	
17 A	.1.23852	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Hard landing System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown Bounced landing Deep (long) landing Deep (long) landing Descent above desired descent profile High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing DME / ILS DME confusion in assessing the final descent point / FAF Unstabilized final approach (high, fast, steep,) Tailwind component above limit Convective weather encounter Frontal surface encounter Incation feep description of primary instruments / displays or standby instrume	167 168 17 17 17 15 15 149 118 119 412 413 414 415 416 417 18 64 225 26 137 145 149	7; 9;	16; 23; 24; 25	26; 36; 37; 39;	
17 A	1123852	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Hard landing System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown Bounced landing Deep (long) landing Deep (long) landing Dees (long) landing Descent above desired descent profile High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing DME / ILS DME confusion in assessing the final descent point / FAF Unstabilized final approach (high, fast, steep,) Tailwind component above limit Convective weather encounter Frontal surface encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). System failure affecting the operation of primary instruments / displays or standby instruments Traffic controller tiredness - Inadequate workload distribution Flaws in maintenance technician / airworthiness specialist trequirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	167 168 173 47 15 149 150 49 1118 119 412 413 414 415 416 417 18 64 225 26 137 149	7; 9;	16; 23; 24; 25	26; 36; 37; 39;	
17 A	1.1.2.3.8.5.2	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Hard landing System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tredness - Inadequate workload distribution Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown Bounced landing Deep (long) landing Deep (long) landing Descent above desired descent profile High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing DME / ILS DME confusion in assessing the final descent point / FAF Unstabilized final approach (high, fast, steep,) Tailwind component above limit Convective weather encounter Frontal surface encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). System failure affecting the operation of primary instruments / displays or standby instruments Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Maintenance technician / airworthiness specialist trequirements definition process and/or training methodology Flaws in maintenance technician / airworthiness specialist requirements definition Process and/or training methodology	167 168 173 47 15 149 118 119 412 413 414 415 416 417 118 62 225 149 150	7; 9;	16; 23; 24; 25	26; 36; 37; 39;	
17 A	11.23852	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Hard landing System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown Bounced landing Deep (long) landing Deep (long) landing Deep (long) landing Descent above desired descent profile High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing DME / ILS DME confusion in assessing the final descent point / FAF Unstabilized final approach (high, fast, steep,) Tailwind component above limit Convective weather encounter Frontal surface encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). System failure affecting the operation of primary instruments / displays or standby instruments Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Maintenance technician / airworthiness specialist trequirements definition process and/or training methodology Lack of adherence to SOP for AlR operations in terms of alerting of flight crew on	167 168 17 17 17 15 15 149 118 119 412 413 414 415 416 417 18 64 225 26 137 145 149	7; 9;	16; 23; 24; 25	26; 36; 37; 39;	
17 A	1123852	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Hard landing System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown Bounced landing Deep (long) landing Deep (long) landing Descent above desired descent profile High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing DME / ILS DME confusion in assessing the final descent point / FAF Unstabilized final approach (high, fast, steep,) Tailwind component above limit Convective weather encounter Frontal surface encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). System failure affecting the operation of primary instruments / displays or standby instruments Traffic controller tredness - Inadequate workload distribution Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Pilot tredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168 173 47 150 149 118 119 412 413 414 415 416 417 18 64 225 26 137 145 150	7; 9;	16; 23; 24; 25	26; 36; 37; 39;	
17 A	.1.23852	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Hard landing System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown Bounced landing Deep (long) landing Deep (long) landing Descent above desired descent profile High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing DME / ILS DME confusion in assessing the final descent point / FAF Unstabilized final approach (high, fast, steep,) Tailwind component above limit Convective weather encounter Frontal surface encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). System failure affecting the operation of primary instruments / displays or standby instruments Traffic controller tredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared	167 168 173 47 15 149 118 119 412 413 414 415 416 417 118 62 225 149 150	7; 9;	16; 23; 24; 25	26; 36; 37; 39;	
17 A	11.23852	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Hard landing System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist triedness - Inadequate workload distribution Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown Bounced landing Deep (long) landing Deep (long) landing Descent above desired descent profile High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing DME / ILS DME confusion in assessing the final descent point / FAF Unstabilized final approach (high, fast, steep,) Tailwind component above limit Convective weather encounter Frontal surface encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g., mountains). System failure affecting the operation of primary instruments / displays or standby instruments Traffic controller tredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to the current technology standards in terms of flight crew on windshear appeared Lack of adherence to the current technology standards in terms of flight crew on windshear appeared	167 168 173 47 150 149 118 119 412 413 414 415 416 417 149 150 150 167 168 214	7; 9;	16; 23; 24; 25	26; 36; 37; 39;	
17 A	11.23852	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Hard landing System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown Bounced landing Deep (long) landing Deep (long) landing Descent above desired descent profile High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing DME / ILS DME confusion in assessing the final descent point / FAF Unstabilized final approach (high, fast, steep,) Tailwind component above limit Convective weather encounter Frontal surface encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). System failure affecting the operation of primary instruments / displays or standby instruments Traffic controller tredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared	167 168 173 47 150 149 118 119 412 413 414 415 416 417 18 64 225 26 137 145 150	7; 9;	16; 23; 24; 25	26; 36; 37; 39;	
17 A	11.23852	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Hard landing System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown Bounced landing Deep (long) landing Deep (long) landing Dees (long) landing Descent above desired descent profile High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing DME / ILS DME confusion in assessing the final descent point / FAF Unstabilized final approach (high, fast, steep,) Tailwind component above limit Convective weather encounter Frontal surface encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). System failure affecting the operation of primary instruments / displays or standby instruments Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Flaws in maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Flaws in mintenance technician / airworthiness specialist requirements definition process and/or training methodology Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared Lack of adherence to the current technology standards	167 168 173 47 150 149 118 119 412 413 414 415 416 417 149 150 150 167 168 214	7; 9;	16; 23; 24; 25	26; 36; 37; 39;	
17 A	1123852	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Hard landing System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown Bounced landing Deep (long) landing Deep (long) landing Descent above desired descent profile High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing DME / ILS DME confusion in assessing the final descent point / FAF Unstabilized final approach (high, fast, steep,) Tailwind component above limit Convective weather encounter Frontal surface encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). System failure affecting the operation of primary instruments / displays or standby instruments Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Maintenance technician / airworthiness specialist trequirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Ina	167 168 173 47 150 49 118 119 412 413 414 415 416 417 18 64 225 26 137 145 149 215 253	7; 9;	16; 23; 24; 25	26; 36; 37; 39;	
17 A	.1.23852	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Hard landing System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown Bounced landing Deep (long) landing Deep (long) landing Dees (long) landing Descent above desired descent profile High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing DME / ILS DME confusion in assessing the final descent point / FAF Unstabilized final approach (high, fast, steep,) Tailwind component above limit Convective weather encounter Frontal surface encounter Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains). System failure affecting the operation of primary instruments / displays or standby instruments Traffic controller tiredness - Inadequate workload distribution Flaws in traffic controller requirements definition process and/or training methodology Flaws in maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Flaws in mintenance technician / airworthiness specialist requirements definition process and/or training methodology Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared Lack of adherence to the current technology standards	167 168 173 47 150 149 118 119 412 413 414 415 416 417 149 150 150 167 168 214	7; 9;	16; 23; 24; 25	26; 36; 37; 39;	



		precursors an	u SP	15			safety certificat
		Inadequate certification process and / or flaws in methodology concerning verification	356				
		of the system / product compliance with requirements - LLWAS system					
		Convective weather / turbulence / windshear encounter conditions during landing	65				
		Pilot tiredness - Inadequate workload distribution	167				
		Flaws in pilot requirements definition process and/or training methodology	168				
		Lack of adherence to emergency procedures - WEM	173				
18	AL23B53	Failure to arm ground-spoilers		7; 9;	16; 23; 24; 25	26; 28; 29; 30; 36; 37; 39;	48; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
		Inappropriate selection of autobrake mode for given runway length and condition	178				
		Late thrust reduction or power-on touchdown	176				
		Delayed selection of reverse thrust	175				
		Late activation of pedal braking or takeover from autobrake, when so required	174				
		Pilot tiredness - Inadequate workload distribution	167				
		Flaws in pilot requirements definition process and/or training methodology	168			+	
		Lack of adherence to SOP in terms of approach and landing	245			+	
		Flaws in CRM training procedures Lack of adherence to the main CRM rules	263 264				
		Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess	116				
		of applicable limit(s), either intentionally or unknowingly	110				
		Hard landing	47				
		Bounced landing	118				
		Deep (long) landing	119				
		Descent above desired descent profile	412				
		High energy approach due to lack of adequate planning or due to challenging design of	413				
		STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent,	1.13				
		vectors, altitude or speed restrictions,)					
		Late deceleration and configuration set-up for approach and landing	414			+	
		DME / ILS DME confusion in assessing the final descent point / FAF	415			+	
		Unstabilized final approach (high, fast, steep,)	416			1	
		Tailwind component above limit	417			1	
		Convective weather encounter	18			†	
		Frontal surface encounter	64			+	
		Lack of adherence to SARPs included in Annex 14 and related documents in terms of	225			+	
		RWY parameters and location, attitude, approach path parameters and obstacles					1
		locations (e.g. mountains).					
		System failure affecting the operation of primary instruments / displays or standby	26			1	
		instruments	Ī				1
		Traffic controller tiredness - Inadequate workload distribution	137				
		Flaws in traffic controller requirements definition process and/or training methodology	145				
		naws in during controller requirements deminion process and/or during methodology	1.5				
		Flaws in maintenance technician / airworthiness specialist requirements definition	149				
		process and/or training methodology					
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
		distribution	130				
		Pilot tiredness - Inadequate workload distribution	167				
		Flaws in pilot requirements definition process and/or training methodology	168				
		Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on	214				
		windshear appeared					
		Lack of adherence to the current technology standards in terms of flight safety	215				
		supporting systems. Lack of PWS System.					
		Inadequate certification process and / or flaws in methodology concerning verification	253				
		of the system / product compliance with requirements - PWS system					
		Flaws in manufacturer quality control process - PWS system components	298				
		Lack of adherence to the current technology standards in terms of flight safety	355				
		supporting systems. Lack of LLWAS System.					
		Inadequate certification process and / or flaws in methodology concerning verification	356				
		of the system / product compliance with requirements - LLWAS system					
		Convective weather / turbulence / windshear encounter conditions during landing	65				
		Convective weather / turbulence / windshear encounter conditions during landing Pilot tiredness - Inadequate workload distribution	65 167				
		Pilot tiredness - Inadequate workload distribution	167				
ESD 25	Code	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168	Technology	Human	Organisation	System of Organisations
ESD 25	Code	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM	167 168	Technology	Human	Organisation	1 1
ı	Code AL25B11	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Identifiable precursors	167 168	<i>o,</i>	Human 13; 14; 18; 25	Organisation 31; 41; 42;	1 1
ı		Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Identifiable precursors Aircraft handling by crew during flare inappropriate	167 168 173	<i>o,</i>			Organisations
ı		Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Identifiable precursors Aircraft handling by crew during flare inappropriate Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess	167 168 173	<i>o,</i>			Organisations 48; 50; 51; 54; 55; 58;
ı		Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Identifiable precursors Aircraft handling by crew during flare inappropriate Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly	167 168 173 116	<i>o,</i>			Organisations 48; 50; 51; 54; 55; 58;
ı		Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Identifiable precursors Aircraft handling by crew during flare inappropriate Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly	167 168 173 116	<i>o,</i>			Organisations 48; 50; 51; 54; 55; 58;
ESD 25		Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Identifiable precursors Aircraft handling by crew during flare inappropriate Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Convective weather / turbulence / windshear or crosswind conditions during take-off	167 168 173 116	<i>o,</i>			Organisations 48; 50; 51; 54; 55; 58;
ı		Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Identifiable precursors Aircraft handling by crew during flare inappropriate Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Convective weather / turbulence / windshear or crosswind conditions during take-off Tailwind component above limit	167 168 173 116 32 417	<i>o,</i>			Organisations 48; 50; 51; 54; 55; 58;
ı		Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Identifiable precursors Aircraft handling by crew during flare inappropriate Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Convective weather / turbulence / windshear or crosswind conditions during take-off Tailwind component above limit Pilot tiredness - Inadequate workload distribution	167 168 173 116 32 417 167	<i>o,</i>			Organisations 48; 50; 51; 54; 55; 58;
ı		Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Identifiable precursors Aircraft handling by crew during flare inappropriate Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Convective weather / turbulence / windshear or crosswind conditions during take-off Tailwind component above limit Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168 173 116 32 417 167 168	<i>o,</i>			Organisations 48; 50; 51; 54; 55; 58;
ı		Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Identifiable precursors Aircraft handling by crew during flare inappropriate Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Convective weather / turbulence / windshear or crosswind conditions during take-off Tailwind component above limit Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Convective weather encounter Continued unstabilized approach (failure to comply with go-around criteria and policy) Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess	167 168 173 116 32 417 167 168 18	<i>o,</i>			Organisations 48; 50; 51; 54; 55; 58;
ı		Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Identifiable precursors Aircraft handling by crew during flare inappropriate Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Convective weather / turbulence / windshear or crosswind conditions during take-off Tailwind component above limit Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Convective weather encounter Continued unstabilized approach (failure to comply with go-around criteria and policy) Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly	167 168 173 116 32 417 167 168 18 13	<i>o,</i>			Organisations 48; 50; 51; 54; 55; 58;
ı		Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Identifiable precursors Aircraft handling by crew during flare inappropriate Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Convective weather / turbulence / windshear or crosswind conditions during take-off Tailwind component above limit Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Convective weather encounter Continued unstabilized approach (failure to comply with go-around criteria and policy) Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent,	167 168 173 116 32 417 167 168 18 13	<i>o,</i>			Organisations 48; 50; 51; 54; 55; 58;
ı		Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Identifiable precursors Aircraft handling by crew during flare inappropriate Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Convective weather / turbulence / windshear or crosswind conditions during take-off Tailwind component above limit Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Convective weather encounter Continued unstabilized approach (failure to comply with go-around criteria and policy) Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,)	167 168 173 116 32 417 167 168 18 13 116	<i>o,</i>			Organisations 48; 50; 51; 54; 55; 58;
ı		Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Identifiable precursors Aircraft handling by crew during flare inappropriate Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Convective weather / turbulence / windshear or crosswind conditions during take-off Tailwind component above limit Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Convective weather encounter Continued unstabilized approach (failure to comply with go-around criteria and policy) Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing	167 168 173 116 32 417 167 168 18 13 116 413	<i>o,</i>			Organisations 48; 50; 51; 54; 55; 58;
ı		Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Identifiable precursors Aircraft handling by crew during flare inappropriate Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Convective weather / turbulence / windshear or crosswind conditions during take-off Tailwind component above limit Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Convective weather encounter Continued unstabilized approach (failure to comply with go-around criteria and policy) Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Unstabilized final approach (high, fast, steep,)	167 168 173 116 32 417 167 168 18 13 116 413	<i>o,</i>			Organisations 48; 50; 51; 54; 55; 58;
ı		Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Identifiable precursors Aircraft handling by crew during flare inappropriate Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Convective weather / turbulence / windshear or crosswind conditions during take-off Tailwind component above limit Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Convective weather encounter Continued unstabilized approach (failure to comply with go-around criteria and policy) Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Unstabilized final approach (high, fast, steep,) Long / floating flare	167 168 173 116 32 417 167 168 18 13 116 413 414 416 426	<i>o,</i>			Organisations 48; 50; 51; 54; 55; 58;
ı		Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Identifiable precursors Aircraft handling by crew during flare inappropriate Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Convective weather / turbulence / windshear or crosswind conditions during take-off Tailwind component above limit Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Convective weather encounter Continued unstabilized approach (failure to comply with go-around criteria and policy) Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Unstabilized final approach (high, fast, steep,)	167 168 173 116 32 417 167 168 18 13 116 413	0,			Organisations 48; 50; 51; 54; 55; 58;
ı		Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Identifiable precursors Aircraft handling by crew during flare inappropriate Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Convective weather / turbulence / windshear or crosswind conditions during take-off Tailwind component above limit Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Convective weather encounter Continued unstabilized approach (failure to comply with go-around criteria and policy) Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Unstabilized final approach (high, fast, steep,) Long / floating flare Convective weather / turbulence / windshear or crosswind conditions during take-off	167 168 173 116 32 417 167 168 18 13 116 413	0,			Organisations 48; 50; 51; 54; 55; 58;
ı		Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Identifiable precursors Aircraft handling by crew during flare inappropriate Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Convective weather / turbulence / windshear or crosswind conditions during take-off Tailwind component above limit Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Convective weather encounter Continued unstabilized approach (failure to comply with go-around criteria and policy) Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Unstabilized final approach (high, fast, steep,) Long / floating flare Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing	167 168 173 116 32 417 167 168 18 13 116 413 414 416 426 32	0,			Organisations 48; 50; 51; 54; 55; 58;
ı		Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Identifiable precursors Aircraft handling by crew during flare inappropriate Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Convective weather / turbulence / windshear or crosswind conditions during take-off Tailwind component above limit Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Convective weather encounter Continued unstabilized approach (failure to comply with go-around criteria and policy) Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Unstabilized final approach (high, fast, steep,) Long / floating flare Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	167 168 173 116 32 417 167 168 18 13 116 413	0,			Organisations 48; 50; 51; 54; 55; 58;
1	AL25B11	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Identifiable precursors Aircraft handling by crew during flare inappropriate Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Convective weather / turbulence / windshear or crosswind conditions during take-off Tailwind component above limit Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Convective weather encounter Continued unstabilized approach (failure to comply with go-around criteria and policy) Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Unstabilized final approach (high, fast, steep,) Long / floating flare Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	1167 168 173 116 32 417 167 168 18 13 116 413 414 416 426 32 245 151	7;	13; 14; 18; 25	31; 41; 42;	Organisations 48; 50; 51; 54; 55; 58; 59; 60; 61; 62;
1		Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Identifiable precursors Aircraft handling by crew during flare inappropriate Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Convective weather / turbulence / windshear or crosswind conditions during take-off Tailwind component above limit Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Convective weather encounter Continued unstabilized approach (failure to comply with go-around criteria and policy) Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Unstabilized final approach (high, fast, steep,) Long / floating flare Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	167 168 173 116 32 417 167 168 18 13 116 413 414 416 426 32	7;			Organisations 48; 50; 51; 54; 55; 58; 59; 60; 61; 62;
1	AL25B11	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures - WEM Identifiable precursors Aircraft handling by crew during flare inappropriate Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Convective weather / turbulence / windshear or crosswind conditions during take-off Tailwind component above limit Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Convective weather encounter Continued unstabilized approach (failure to comply with go-around criteria and policy) Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Unstabilized final approach (high, fast, steep,) Long / floating flare Convective weather / turbulence / windshear or crosswind conditions during take-off Lack of adherence to SOP in terms of approach and landing Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	1167 168 173 116 32 417 167 168 18 13 116 413 414 416 426 32 245 151	7;	13; 14; 18; 25	31; 41; 42;	Organisations 48; 50; 51; 54; 55; 58; 59; 60; 61; 62;



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4 AL25B14	Pilot tiredness - Inadequate workload distribution	167		25	41;	48; 50; 51; 54; 55; 58;
	Flaws in pilot requirements definition process and/or training methodology	168				59; 60; 61; 62;
	Lack of adherence to SOP in terms of approach and landing	245				
	Aggressive maneuvering / overcontrolling	182				
	Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess	116				
П	of applicable limit(s), either intentionally or unknowingly Structural failure					
5 AL25B21	Hard landing	47	7;	13; 14; 15; 18; 25	31; 38; 41; 42;	48; 50; 51; 54; 55; 58;
						59; 60; 61; 62;
	Bounced landing Inadequate certification process and / or flaws in methodology concerning verification	118 358				
	of the system / product compliance with requirements - Landing gear components	336				
	,					
	Flaws in maintenance technician / airworthiness specialist requirements definition	149				
	process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
	distribution	130				
	Flaws in aircraft system maintenance process definition - Landing gear components.	377				
	Flaws in manufacturer quality control process - Landing gear components.	376				
	Convective weather encounter Continued unstabilized approach (failure to comply with go-around criteria and policy)	18 13				
	Continued unstabilized approach (failure to comply with go-around criteria and policy)	13				
	Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess	116				
	of applicable limit(s), either intentionally or unknowingly					
	Convective weather / turbulence / windshear or crosswind conditions during take-off	32				
	High energy approach due to lack of adequate planning or due to challenging design of	413				
	STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent,	_				
	vectors, altitude or speed restrictions,)					
	Late deceleration and configuration set-up for approach and landing	414	-			
	Unstabilized final approach (high, fast, steep,) Tailwind component above limit	416 417	+			
	Long / floating flare	417				
	Lack of adherence to SOP in terms of approach and landing	245				
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology Aggressive maneuvering / overcontrolling	168 182				
	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
	or / and passive contribution to the PF duties					
6 AL25B22	Hard landing	47	7;	13; 14; 15; 18; 25	31; 38; 41; 42;	48; 50; 51; 54; 55; 58;
	Bounced landing	118				59; 60; 61; 62;
	Convective weather encounter	18				
	Continued unstabilized approach (failure to comply with go-around criteria and policy)	13				
	Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess	116				
	of applicable limit(s), either intentionally or unknowingly Convective weather / turbulence / windshear or crosswind conditions during take-off	32				
	contestive wedner / tarbarette / timastear or cross-tima containing take on	-				
	0 0, 11	413				
	STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent,					
	vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing	414				
	Unstabilized final approach (high, fast, steep,)	416				
	Tailwind component above limit	417				
	Long / floating flare	426				
	Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution	245 167				
	Flaws in pilot requirements definition process and/or training methodology	168				
	Aggressive maneuvering / overcontrolling	182				
	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
III	or / and passive contribution to the PF duties Flight crew fails to maintain control	-				
7 AL25B31	none	H	7;	13; 14; 15; 18; 25	31; 38; 41; 42;	48; 50; 51; 54; 55; 58
						59; 60; 61; 62;
	Convective weather encounter	18				
	Continued unstabilized approach (failure to comply with go-around criteria and policy)	13				
	Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess	116				
	of applicable limit(s), either intentionally or unknowingly					
	Convective weather / turbulence / windshear or crosswind conditions during take-off	32				
	High energy approach due to lack of adequate planning or due to challenging design of	413				
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	STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent,		T. Control of the Con	1		
	vectors, altitude or speed restrictions,)	L				
	vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing	414				
	vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Unstabilized final approach (high, fast, steep,)	416				
	vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Unstabilized final approach (high, fast, steep,) Tailwind component above limit					
	vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Unstabilized final approach (high, fast, steep,)	416 417				
	vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Unstabilized final approach (high, fast, steep,) Tailwind component above limit Long / floating flare Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution	416 417 426 245 167				
	vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Unstabilized final approach (high, fast, steep,) Tailwind component above limit Long / floating flare Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	416 417 426 245 167 168				
	vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Unstabilized final approach (high, fast, steep,) Tailwind component above limit Long / floating flare Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Aggressive maneuvering / overcontrolling	416 417 426 245 167 168 182				
	vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Unstabilized final approach (high, fast, steep,) Tailwind component above limit Long / floating flare Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	416 417 426 245 167 168				
	vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Unstabilized final approach (high, fast, steep,) Tailwind component above limit Long / floating flare Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Aggressive maneuvering / overcontrolling Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	416 417 426 245 167 168 182				
	vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Unstabilized final approach (high, fast, steep,) Tailwind component above limit Long / floating flare Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Aggressive maneuvering / overcontrolling Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Hard landing Bounced landing	416 417 426 245 167 168 182 151 47				
	vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Unstabilized final approach (high, fast, steep,) Tailwind component above limit Long / floating flare Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Aggressive maneuvering / overcontrolling Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Hard landing	416 417 426 245 167 168 182 151				



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	Flaws in maintenance technician / airworthiness specialist requirements definition	149				
1	process and/or training methodology					1
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
	distribution					
	Flaws in aircraft system maintenance process definition - Landing gear components.	377				
		376				_
0.4125022	Flaws in manufacturer quality control process - Landing gear components.		-	12 14 15 10 25	24 20 44 42	48; 50; 51; 54; 55; 5
8 AL25B32	Pilot tiredness - Inadequate workload distribution	167	/;	13; 14; 15; 18; 25	31; 38; 41; 42;	
		₩				59; 60; 61; 62;
	Flaws in pilot requirements definition process and/or training methodology	168				
	Lack of adherence to emergency procedures	448				
	Convective weather encounter	18				
	Continued unstabilized approach (failure to comply with go-around criteria and policy)	13				
	, .					
	Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess	116				
	of applicable limit(s), either intentionally or unknowingly	110				
	Convective weather / turbulence / windshear or crosswind conditions during take-off	32				
	convective weather / turbulence / windshear or crosswind conditions during take-on	32				
		1				
	High energy approach due to lack of adequate planning or due to challenging design of	413				
	STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent,					
	vectors, altitude or speed restrictions,)					
	Late deceleration and configuration set-up for approach and landing	414				
	Unstabilized final approach (high, fast, steep,)	416				
	Tailwind component above limit	417				
	Long / floating flare	426				
	Lack of adherence to SOP in terms of approach and landing	245				+
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168				-
	Aggressive maneuvering / overcontrolling	182				
	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
	or / and passive contribution to the PF duties	1			1	1
	Hard landing	47			İ	
+	Bounced landing	118			1	
+		358			+	+
	Inadequate certification process and / or flaws in methodology concerning verification	338				1
	of the system / product compliance with requirements - Landing gear components					1
		₩				
	Flaws in maintenance technician / airworthiness specialist requirements definition	149				1
	process and/or training methodology					1
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
	distribution					
	Flaws in aircraft system maintenance process definition - Landing gear components.	377				1
		376				
	Flaws in manufacturer quality control process - Landing gear components.		_			
9 AL25B33	Pilot tiredness - Inadequate workload distribution	167	7;	13; 14; 15; 18; 25	31; 38; 41; 42;	48; 50; 51; 54; 55;
						59; 60; 61; 62;
	Flaws in pilot requirements definition process and/or training methodology	168				
	Lack of adherence to emergency procedures	448				
	Convective weather encounter	18			Ť	
	Continued unstabilized approach (failure to comply with go-around criteria and policy)	13				1
	continued unstabilized approach (failure to comply with go-around criteria and policy)	13				
						1
	Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess	116				
	of applicable limit(s), either intentionally or unknowingly	\perp				
	Convective weather / turbulence / windshear or crosswind conditions during take-off	32				
	High energy approach due to lack of adequate planning or due to challenging design of	413				
	STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent,					
	vectors, altitude or speed restrictions,)					
	Late deceleration and configuration set-up for approach and landing	414				+
					-	-
	Unstabilized final approach (high, fast, steep,)	416				
	Tailwind component above limit	417				
	Long / floating flare	426			The second secon	1
	Lack of adherence to SOP in terms of approach and landing	245	<u> </u>			
	Lack of adherence to SOP in terms of approach and landing	245 167				
	Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution	167				
	Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168				
	Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Aggressive maneuvering / overcontrolling	167 168 182				
	Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Aggressive maneuvering / overcontrolling Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	167 168				
	Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Aggressive maneuvering / overcontrolling Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	167 168 182 151				
	Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Aggressive maneuvering / overcontrolling Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Hard landing	167 168 182 151				
	Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Aggressive maneuvering / overcontrolling Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Hard landing Bounced landing	167 168 182 151 47 118				
	Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Aggressive maneuvering / overcontrolling Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Hard landing	167 168 182 151				
	Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Aggressive maneuvering / overcontrolling Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Hard landing Bounced landing	167 168 182 151 47 118				
	Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Aggressive maneuvering / overcontrolling Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Hard landing Bounced landing Inadequate certification process and / or flaws in methodology concerning verification	167 168 182 151 47 118				
	Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Aggressive maneuvering / overcontrolling Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Hard landing Bounced landing Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	167 168 182 151 47 118 358				
	Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Aggressive maneuvering / overcontrolling Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Hard landing Bounced landing Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Flaws in maintenance technician / airworthiness specialist requirements definition	167 168 182 151 47 118				
	Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Aggressive maneuvering / overcontrolling Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Hard landing Bounced landing Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	167 168 182 151 47 118 358				
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	Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Aggressive maneuvering / overcontrolling Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Hard landing Bounced landing Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	167 168 182 151 47 118 358				
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	Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Aggressive maneuvering / overcontrolling Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Hard landing Bounced landing Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components.	167 168 182 151 47 118 358 149 150 377 376				
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10 AL25B34	Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Aggressive maneuvering / overcontrolling Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Hard landing Bounced landing Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components.	167 168 182 151 47 118 358 149 150 377 376	7;	13; 14; 15; 18; 25	31; 38; 41; 42;	48; 50; 51; 54; 55; 59; 60; 61; 62;
10 AL25B34	Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Aggressive maneuvering / overcontrolling Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Hard landing Bounced landing Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Pilot tiredness - Inadequate workload distribution	167 168 182 151 47 118 358 149 150 377 376 167	7;	13; 14; 15; 18; 25	31; 38; 41; 42;	
10 AL25B34	Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Aggressive maneuvering / overcontrolling Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Hard landing Bounced landing Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168 182 151 47 118 358 149 150 377 376 167	7;	13; 14; 15; 18; 25	31; 38; 41; 42;	
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10 AL25B34	Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Aggressive maneuvering / overcontrolling Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Hard landing Bounced landing Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Convective weather encounter	167 168 182 151 47 118 358 149 150 377 376 167 168 448 18	7;	13; 14; 15; 18; 25	31; 38; 41; 42;	
10 AL25B34	Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Aggressive maneuvering / overcontrolling Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Hard landing Bounced landing Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures	167 168 182 151 47 118 358 149 150 377 376 167 168 448	7;	13; 14; 15; 18; 25	31; 38; 41; 42;	
10 AL25B34	Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Aggressive maneuvering / overcontrolling Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Hard landing Bounced landing Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Convective weather encounter	167 168 182 151 47 118 358 149 150 377 376 167 168 448 18	7;	13; 14; 15; 18; 25	31; 38; 41; 42;	
10 AL25B34	Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Aggressive maneuvering / overcontrolling Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Hard landing Bounced landing Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Convective weather encounter	167 168 182 151 47 118 358 149 150 377 376 167 168 448 18	7;	13; 14; 15; 18; 25	31; 38; 41; 42;	
10 AL25B34	Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Aggressive maneuvering / overcontrolling Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Hard landing Bounced landing Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Convective weather encounter Continued unstabilized approach (failure to comply with go-around criteria and policy) Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess	167 168 182 151 47 118 358 149 150 377 376 167 168 448 18	7;	13; 14; 15; 18; 25	31; 38; 41; 42;	
10 AL25B34	Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Aggressive maneuvering / overcontrolling Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Hard landing Bounced landing Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Convective weather encounter Continued unstabilized approach (failure to comply with go-around criteria and policy) Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly	167 168 182 151 47 118 358 149 150 377 376 167 168 448 18 13	7;	13; 14; 15; 18; 25	31; 38; 41; 42;	
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10 AL25B34	Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Aggressive maneuvering / overcontrolling Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Hard landing Bounced landing Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Convective weather encounter Continued unstabilized approach (failure to comply with go-around criteria and policy) Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Convective weather / turbulence / windshear or crosswind conditions during take-off	167 168 182 151 47 118 358 149 150 377 376 167 168 448 13	7;	13; 14; 15; 18; 25	31; 38; 41; 42;	48; 50; 51; 54; 55; 59; 60; 61; 62;
10 AL25B34	Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Aggressive maneuvering / overcontrolling Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Hard landing Bounced landing Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Convective weather encounter Continued unstabilized approach (failure to comply with go-around criteria and policy) Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Convective weather / turbulence / windshear or crosswind conditions during take-off High energy approach due to lack of adequate planning or due to challenging design of	167 168 182 151 47 118 358 149 150 377 376 167 168 448 18 13	7;	13; 14; 15; 18; 25	31; 38; 41; 42;	
10 AL25B34	Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Aggressive maneuvering / overcontrolling Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Hard landing Bounced landing Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Convective weather encounter Continued unstabilized approach (failure to comply with go-around criteria and policy) Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Convective weather / turbulence / windshear or crosswind conditions during take-off	167 168 182 151 47 118 358 149 150 377 376 167 168 448 13	7;	13; 14; 15; 18; 25	31; 38; 41; 42;	



		Unstabilized final approach (high, fast, steep,)	416				
		Tailwind component above limit	417				
		Long / floating flare	426				
		Lack of adherence to SOP in terms of approach and landing	245				
		Pilot tiredness - Inadequate workload distribution	167			+	+
\rightarrow			_			+	_
_		Flaws in pilot requirements definition process and/or training methodology	168				
		Aggressive maneuvering / overcontrolling	182				
		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
		or / and passive contribution to the PF duties					
		Hard landing	47				
_			118		+	1	
		Bounced landing	_				
		Inadequate certification process and / or flaws in methodology concerning verification	358				
		of the system / product compliance with requirements - Landing gear components					
		Flaws in maintenance technician / airworthiness specialist requirements definition	149				
		process and/or training methodology	1				
_					+		
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
		distribution					
		Flaws in aircraft system maintenance process definition - Landing gear components.	377				
		Flaws in manufacturer quality control process - Landing gear components.	376				
D 26	Code	Identifiable precursors	-	Technology	Human	Organisation	System of
5D 20	code	identifiable precursors		recrinology	пишан	Organisation	'
					_		Organisations
- 1		Aircraft handling by flight crew during landing roll inappropriate					
1	AL26B11	Temporary loss of directional control during rollout	120		24; 25		48; 50; 51; 54; 55; 5
		, , , , , , , , , , , , , , , , , , ,			* -		59; 60; 61; 62;
\rightarrow		0.6	442		+		33, 00, 01, 02,
		High energy approach due to lack of adequate planning or due to challenging design of	413			1	1
		STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent,	1			1	1
		vectors, altitude or speed restrictions,)					
\neg		Late deceleration and configuration set-up for approach and landing	414				
\dashv		Failure to remember / assess crosswind component limit for prevailing runway	418			+	+
			418				
		condition	_				
\neg		Inadequate crosswind landing / decrab technique	425				
\neg		Touchdown off centerline	427			1	
-			433		1	+	1
-		Use of nose wheel steering tiller during rollout			+	+	+
		Lack of adherence to SOP in terms of approach and landing	245		1	1	
		Pilot tiredness - Inadequate workload distribution	167				
		Flaws in pilot requirements definition process and/or training methodology	168				
2	AL26B12	Failure to arm ground-spoilers	177		24; 25	28; 29; 30; 40;	50; 51; 54; 55; 58;
- 4	ALZUDIZ	railule to ariii ground-spoilers	1//		24, 23	28, 29, 30, 40,	
_			_				60; 61; 62;
		Inappropriate selection of autobrake mode for given runway length and condition	178				
		Delayed selection of reverse thrust	175				
\neg		Inappropriate use of differential reverse thrust	430				
\rightarrow			_		+	+	
\rightarrow		Late activation of pedal braking or takeover from autobrake, when so required	174				
		Inadequate use of differential braking	432				
		Lack of adherence to SOP in terms of approach and landing	245				
		Pilot tiredness - Inadequate workload distribution	167				
_		Flaws in pilot requirements definition process and/or training methodology	168		+		
		riaws in pilot requirements definition process and/or training methodology	100				
3 .	AL26B13	Lack of adherence to SOP in terms of approach and landing	245		24;	30; 40;	
3	AL26B13	Lack of adherence to SOP in terms of approach and landing	245		24;	30; 40;	60; 61; 62;
3 /	AL26B13	Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution	245 167		24;	30; 40;	
3 /	AL26B13	Pilot tiredness - Inadequate workload distribution	167		24;	30; 40;	
3 /	AL26B13	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168		24;	30; 40;	
3 /	AL26B13	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of	167		24;	30; 40;	
3 /	AL26B13	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168		24;	30; 40;	
3 /	AL26B13	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of	167 168		24;	30; 40;	
3 /	AL26B13	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures	167 168 246 263		24;	30; 40;	
3 /	AL26B13	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules	167 168 246 263 264		24;	30; 40;	
3 /	AL26B13	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	167 168 246 263		24;	30; 40;	50; 51; 54; 55; 58; ¹ 60; 61; 62;
		Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	167 168 246 263 264		24;	30; 40;	60; 61; 62;
	AL26B13	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess	167 168 246 263 264		24;	30; 40;	
		Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess	167 168 246 263 264 151		24;	30; 40;	48; 50; 51; 54; 55;
		Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly	167 168 246 263 264 151		24;	30; 40;	60; 61; 62;
		Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Convective weather encounter	167 168 246 263 264 151 116		24;	30; 40;	48; 50; 51; 54; 55;
4.		Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Convective weather encounter Adverse weather / poor visibility conditions / darkness	167 168 246 263 264 151		24;	30; 40;	48; 50; 51; 54; 55;
		Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Convective weather encounter	167 168 246 263 264 151 116		24;	30; 40;	48; 50; 51; 54; 55; 59; 60; 61; 62;
4		Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Convective weather encounter Adverse weather / poor visibility conditions / darkness	167 168 246 263 264 151 116		24; 25	28; 29; 30; 40;	48; 50; 51; 54; 55; 59; 60; 61; 62;
4 .	AL26B14	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Convective weather encounter Adverse weather / poor visibility conditions / darkness Flight crew fails to maintain control	167 168 246 263 264 151 116				48; 50; 51; 54; 55; 59; 60; 61; 62; 48; 50; 51; 54; 55;
4 .	AL26B14	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Convective weather encounter Adverse weather / poor visibility conditions / darkness Flight crew fails to maintain control none	167 168 246 263 264 151 116 18 6				48; 50; 51; 54; 55;
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4 .	AL26B14	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Convective weather encounter Adverse weather / poor visibility conditions / darkness Flight crew fails to maintain control none Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess	167 168 246 263 264 151 116 18 6				48; 50; 51; 54; 55; 59; 60; 61; 62; 48; 50; 51; 54; 55;
4	AL26B14	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Convective weather encounter Adverse weather / poor visibility conditions / darkness Flight crew fails to maintain control none Convective weather encounter	167 168 246 263 264 151 116 18 6				48; 50; 51; 54; 55; 59; 60; 61; 62; 48; 50; 51; 54; 55;
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4	AL26B14	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Lack of adherence to the main CRM rules Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Convective weather encounter Adverse weather / poor visibility conditions / darkness Flight crew fails to maintain control none Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Failure to remember / assess crosswind component limit for prevailing runway condition Inappropriate selection of autobrake mode for given runway length and condition Inappropriate crosswind landing / decrab technique Touchdown off centerline Delayed selection of reverse thrust Inappropriate use of differential reverse thrust Late activation of pedal braking or takeover from autobrake, when so required inadequate use of differential braking	167 168 246 246 151 116 18 6 120 6 413 178 414 418 425 427 175 430 174 432				48; 50; 51; 54; 55; 59; 60; 61; 62; 48; 50; 51; 54; 55;
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4	AL26B14	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Lack of adherence to the main CRM rules Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Convective weather encounter Adverse weather / poor visibility conditions / darkness Flight crew fails to maintain control none Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Failure to remember / assess crosswind component limit for prevailing runway condition Inappropriate selection of autobrake mode for given runway length and condition Inappropriate selection of reverse thrust Inappropriate use of differential reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Inadequate use of differential braking Use of nose wheel steering tiller during rollout	167 168 246 246 151 116 18 6 120 6 413 178 414 418 425 427 175 430 174 432				48; 50; 51; 54; 55; 59; 60; 61; 62; 48; 50; 51; 54; 55;
4	AL26B14	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Lack of adherence to the main CRM rules Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Convective weather encounter Adverse weather / poor visibility conditions / darkness Flight crew fails to maintain control none Convective weather / poor visibility conditions / darkness Flight crew fails to maintain control none Convective weather / poor visibility conditions / darkness flight crew fails to maintain control uning rollout Adverse weather / poor visibility conditions / darkness High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Failure to remember / assess crosswind component limit for prevailing runway condition Inapropriate selection of autobrake mode for given runway length and condition Inapequate crosswind landing / decrab technique Touchdown off centerline Delayed selection of reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Inadequate use of differential reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Inadequate use of differential reverse thrust Lack of adherence to SOP in terms of approach and landing	167 168 246 263 264 151 116 18 6 120 6 413 414 418 178 425 175 430 174 432 433 245				48; 50; 51; 54; 55; 59; 60; 61; 62; 48; 50; 51; 54; 55;
4 .	AL26B14	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Lack of adherence to the main CRM rules Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Convective weather encounter Adverse weather / poor visibility conditions / darkness Flight crew fails to maintain control none Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Failure to remember / assess crosswind component limit for prevailing runway condition Inappropriate selection of autobrake mode for given runway length and condition Inappropriate selection of everse thrust Late activation of peeds braking or takeover from autobrake, when so required Inadequate use of differential reverse thrust Late of nose wheel steering tiller during rollout Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution	167 168 246 263 264 151 116 18 6 				48; 50; 51; 54; 55; 59; 60; 61; 62; 48; 50; 51; 54; 55;
4 .	AL26B14	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Lack of adherence to the main CRM rules Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Convective weather encounter Adverse weather / poor visibility conditions / darkness Flight crew fails to maintain control none Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Failure to remember / assess crosswind component limit for prevailing runway condition Inappropriate selection of autobrake mode for given runway length and condition linadequate crosswind landing / decrab technique Touchdown off centerline Delayed selection of reverse thrust Inappropriate use of differential braking Use of nose wheel steering tiller during rollout Lack of adherence to SOP in terms of approach and landing Flaws in pilot requirements definition process and/or training methodology	167 168 246 263 264 151 116 18 6 120 6 413 414 418 178 425 427 175 430 174 432 433 245 167 168				48; 50; 51; 54; 55; 59; 60; 61; 62; 48; 50; 51; 54; 55;
4 .	AL26B14	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Lack of adherence to the main CRM rules Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Convective weather encounter Adverse weather / poor visibility conditions / darkness Flight crew fails to maintain control none Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Failure to remember / assess crosswind component limit for prevailing runway condition Inappropriate selection of autobrake mode for given runway length and condition Inappropriate selection of everse thrust Late activation of peeds braking or takeover from autobrake, when so required Inadequate use of differential reverse thrust Late of nose wheel steering tiller during rollout Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution	167 168 246 263 264 151 116 18 6 				48; 50; 51; 54; 55; 59; 60; 61; 62; 48; 50; 51; 54; 55;
4 .	AL26B14	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Lack of adherence to the main CRM rules Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Convective weather encounter Adverse weather / poor visibility conditions / darkness Flight crew fails to maintain control none Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Failure to remember / assess crosswind component limit for prevailing runway condition Inappropriate selection of autobrake mode for given runway length and condition Inadequate crosswind landing / decrab technique Touchdown off centerline Delayed selection of reverse thrust Inappropriate use of differential reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Inadequate use of differential praking Use of nose wheel steering tiller during rollout Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Lack of adherence to SOP in terms of piproach and checklist before initiating of	167 168 246 263 264 151 116 18 6 120 6 413 414 418 178 425 427 175 430 174 432 433 245 167 168				48; 50; 51; 54; 55; 59; 60; 61; 62; 48; 50; 51; 54; 55;
4 .	AL26B14	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing Flaws in CRM training procedures Lack of adherence to the main CRM rules Lack of adherence to the main CRM rules Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Convective weather encounter Adverse weather / poor visibility conditions / darkness Flight crew fails to maintain control none Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Failure to remember / assess crosswind component limit for prevailing runway condition Inappropriate selection of autobrake mode for given runway length and condition linadequate crosswind landing / decrab technique Touchdown off centerline Delayed selection of reverse thrust Inappropriate use of differential braking Use of nose wheel steering tiller during rollout Lack of adherence to SOP in terms of approach and landing Flaws in pilot requirements definition process and/or training methodology	167 168 246 263 264 151 116 18 6 120 6 413 414 418 178 425 427 175 430 174 432 433 245 167 168				48; 50; 51; 54; 55; 59; 60; 61; 62; 48; 50; 51; 54; 55;



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	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
	or / and passive contribution to the PF duties	-				
6 AL26B22	Pilot tiredness - Inadequate workload distribution	167		24; 25	28; 29; 30; 40;	48; 50; 51; 54; 55; 5
	· ·					59; 60; 61; 62;
	Flaws in pilot requirements definition process and/or training methodology	168				
	Lack of adherence to emergency procedures	448				
+	Convective weather encounter	18				
		_				
	Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess	116				
	of applicable limit(s), either intentionally or unknowingly					
	Temporary loss of directional control during rollout	120				
	Adverse weather / poor visibility conditions / darkness	6				
	High energy approach due to lack of adequate planning or due to challenging design of	413				
	STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent,					
	vectors, altitude or speed restrictions,)					
+		414				
	Late deceleration and configuration set-up for approach and landing	_				
	Failure to remember / assess crosswind component limit for prevailing runway	418				
	condition					
	Inappropriate selection of autobrake mode for given runway length and condition	178				
	Inadequate crosswind landing / decrab technique	425				
	Touchdown off centerline	427				
	Delayed selection of reverse thrust	175			1	
+		_				
	Inappropriate use of differential reverse thrust	430				
	Late activation of pedal braking or takeover from autobrake, when so required	174				
	Inadequate use of differential braking	432				
	Use of nose wheel steering tiller during rollout	433				
	Lack of adherence to SOP in terms of approach and landing	245				
+	Pilot tiredness - Inadequate workload distribution	167			+	
+					 	
+	Flaws in pilot requirements definition process and/or training methodology	168			1	
	Lack of adherence to SOP in terms of briefing and checklist before initiating of	246				
	approach and landing				<u> </u>	
	Flaws in CRM training procedures	263				
	Lack of adherence to the main CRM rules	264				
+	Lack of adherence to the main child rules Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151			 	
		131				
7 4126022	or / and passive contribution to the PF duties	4.0=		24.25	20 20 20 12	40 50 51 51 5
7 AL26B23	Pilot tiredness - Inadequate workload distribution	167		24; 25	28; 29; 30; 40;	48; 50; 51; 54; 55;
						59; 60; 61; 62;
	Flaws in pilot requirements definition process and/or training methodology	168				
	Lack of adherence to emergency procedures	448				
	Convective weather encounter	18				
+	Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess	116				
		110				
	of applicable limit(s), either intentionally or unknowingly					
	Temporary loss of directional control during rollout	120				
	Adverse weather / poor visibility conditions / darkness	6				
	High energy approach due to lack of adequate planning or due to challenging design of	413				
	STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent,					
	vectors, altitude or speed restrictions,)					
	Late deceleration and configuration set-up for approach and landing	414				
	Failure to remember / assess crosswind component limit for prevailing runway	418				
	condition					
	Inappropriate selection of autobrake mode for given runway length and condition	178				
	Inadequate crosswind landing / decrab technique	425				
	Touchdown off centerline	427			+	
	Delayed selection of reverse thrust	175				
	Inappropriate use of differential reverse thrust	430				
	Late activation of pedal braking or takeover from autobrake, when so required	174				
	Inadequate use of differential braking	432				
	Use of nose wheel steering tiller during rollout	433			1	
+	ů ů	_			 	
	Lack of adherence to SOP in terms of approach and landing	245			-	
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168				
	Lack of adherence to SOP in terms of briefing and checklist before initiating of	246				
	approach and landing					1
+	Flaws in CRM training procedures	263			 	
+					+	
-	Lack of adherence to the main CRM rules	264			1	
	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
1	or / and passive contribution to the PF duties					
1					28; 29; 30; 40;	48; 50; 51; 54; 55;
8 AL26B24	Pilot tiredness - Inadequate workload distribution	167		24; 25		59; 60; 61; 62;
8 AL26B24		167		24; 25		59; 60; 61; 62;
8 AL26B24	Pilot tiredness - Inadequate workload distribution			24; 25		59; 60; 61; 62;
8 AL26B24	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	168		24; 25		59; 60; 61; 62;
8 AL26B24	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures	168 448		24; 25		59; 60; 61; 62;
8 AL26B24	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Convective weather encounter	168 448 18		24; 25		59, 60, 61, 62,
8 AL26B24	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess	168 448		24; 25		59; 60; 61; 62;
8 AL26B24	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Convective weather encounter	168 448 18		24; 25		59; 60; 61; 62;
8 AL26B24	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess	168 448 18		24; 25		59; 60; 61; 62;
8 AL26B24	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout	168 448 18 116		24; 25		59; 60; 61; 62;
8 AL26B24	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness	168 448 18 116 120 6		24; 25		59; 60; 61; 62;
8 AL26B24	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness High energy approach due to lack of adequate planning or due to challenging design of	168 448 18 116		24; 25		59; 60; 61; 62;
8 AL26B24	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent,	168 448 18 116 120 6		24; 25		59; 60; 61; 62;
8 AL26B24	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,)	168 448 18 116 120 6 413		24; 25		59; 60; 61; 62;
8 AL26B24	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent,	168 448 18 116 120 6 413		24; 25		59; 60; 61; 62;
8 AL26B24	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,)	168 448 18 116 120 6 413		24; 25		59; 60; 61; 62;
8 AL26B24	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Failure to remember / assess crosswind component limit for prevailing runway	168 448 18 116 120 6 413		24; 25		59; 60; 61; 62;
8 AL26B24	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Failure to remember / assess crosswind component limit for prevailing runway condition	168 448 18 116 120 6 413 414 418		24; 25		59; 60; 61; 62;
8 AL26B24	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Failure to remember / assess crosswind component limit for prevailing runway condition Inappropriate selection of autobrake mode for given runway length and condition	168 448 18 116 120 6 413 414 418		24; 25		59; 60; 61; 62;
8 AL26B24	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Failure to remember / assess crosswind component limit for prevailing runway condition Inappropriate selection of autobrake mode for given runway length and condition Inadequate crosswind landing / decrab technique	168 448 18 116 120 6 413 414 418 178 425		24; 25		39, 60, 61, 62,
8 AL26B24	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Failure to remember / assess crosswind component limit for prevailing runway condition Inappropriate selection of autobrake mode for given runway length and condition	168 448 18 116 120 6 413 414 418		24; 25		59; 60; 61; 62;
8 AL26B24	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Failure to remember / assess crosswind component limit for prevailing runway condition Inappropriate selection of autobrake mode for given runway length and condition Inadequate crosswind landing / decrab technique Touchdown off centerline	168 448 18 116 120 6 413 414 418 178 425 427		24; 25		59; 60; 61; 62;
8 AL26B24	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Failure to remember / assess crosswind component limit for prevailing runway condition Inappropriate selection of autobrake mode for given runway length and condition Inadequate crosswind landing / decrab technique Touchdown off centerline Delayed selection of reverse thrust	168 448 18 116 120 6 413 414 418 178 425 427 175		24; 25		59; 60; 61; 62;
8 AL26B24	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Failure to remember / assess crosswind component limit for prevailing runway condition Inappropriate selection of autobrake mode for given runway length and condition Inadequate crosswind landing / decrab technique Touchdown off creverse thrust Inappropriate use of differential reverse thrust	168 448 18 116 120 6 413 414 418 178 425 427 175 430		24; 25		59; 60; 61; 62;
8 AL26B24	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Failure to remember / assess crosswind component limit for prevailing runway condition Inappropriate selection of autobrake mode for given runway length and condition Inadequate crosswind landing / decrab technique Touchdown off centerline Delayed selection of reverse thrust Inappropriate use of differential reverse thrust Late activation of pedal braking or takeover from autobrake, when so required	168 448 18 116 120 6 413 414 418 178 425 427 175 430 174		24; 25		59; 60; 61; 62;
8 AL26B24	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Failure to remember / assess crosswind component limit for prevailing runway condition Inappropriate selection of autobrake mode for given runway length and condition Inadequate crosswind landing / decrab technique Touchdown off creverse thrust Inappropriate use of differential reverse thrust	168 448 18 116 120 6 413 414 418 178 425 427 175 430		24; 25		59; 60; 61; 62;
8 AL26B24	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Failure to remember / assess crosswind component limit for prevailing runway condition Inappropriate selection of autobrake mode for given runway length and condition Inadequate crosswind landing / decrab technique Touchdown off centerline Delayed selection of reverse thrust Inappropriate use of differential reverse thrust Late activation of pedal braking or takeover from autobrake, when so required	168 448 18 116 120 6 413 414 418 178 425 427 175 430 174		24; 25		59; 60; 61; 62;
8 AL26B24	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to emergency procedures Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Failure to remember / assess crosswind component limit for prevailing runway condition Inappropriate selection of autobrake mode for given runway length and condition Inadequate crosswind landing / decrab technique Touchdown off centerline Delayed selection of reverse thrust Inappropriate use of differential reverse thrust Late activation of peedal praking or takeover from autobrake, when so required Inadequate use of differential braking	168 448 18 116 120 6 413 414 418 178 425 427 175 430 174 432		24; 25		39; 60; 61; 62;



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		Flaws in pilot requirements definition process and/or training methodology	168				
		Lack of adherence to SOP in terms of briefing and checklist before initiating of	246				
		approach and landing					
		Flaws in CRM training procedures	263				
		Lack of adherence to the main CRM rules	264				
		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
		or / and passive contribution to the PF duties					
III		Failure to achieve maximum braking					
	AL26B31	Adverse weather in terms of heavy rain or icing conditions resulted with decreased	45		24; 25	28; 29; 30; 40;	48; 50; 51; 52; 53; 54
		RWY surface friction rate	"		,	,,,	55; 58; 59; 60; 61; 62
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		Pilot tiredness - Inadequate workload distribution	167				
		Flaws in pilot requirements definition process and/or training methodology	168				
		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY					
		· ·	203				
		surface condition. Snow / ice presence / or runway surface friction rate below					
		minimum					
		Convective weather encounter	18				
		Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess	116				
		of applicable limit(s), either intentionally or unknowingly					
		Temporary loss of directional control during rollout	120				
		Adverse weather / poor visibility conditions / darkness	6				
		High energy approach due to lack of adequate planning or due to challenging design of	413				
		STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent,					
		vectors, altitude or speed restrictions,)					
		Late deceleration and configuration set-up for approach and landing	414				
		Failure to remember / assess crosswind component limit for prevailing runway	418				
		condition	1.10				
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		Inappropriate selection of autobrake mode for given runway length and condition	_				
		Inadequate crosswind landing / decrab technique	425				
		Touchdown off centerline	427				
		Delayed selection of reverse thrust	175				
		Inappropriate use of differential reverse thrust	430				
		Late activation of pedal braking or takeover from autobrake, when so required	174				
		Inadequate use of differential braking	432				
		Use of nose wheel steering tiller during rollout	433				
		Lack of adherence to SOP in terms of approach and landing	245				
_		Pilot tiredness - Inadequate workload distribution	167				
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		Flaws in pilot requirements definition process and/or training methodology					
		Lack of adherence to SOP in terms of briefing and checklist before initiating of	246				
		approach and landing	_				
		Flaws in CRM training procedures	263				
		Lack of adherence to the main CRM rules	264				
		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
		or / and passive contribution to the PF duties					
		Pilot tiredness - Inadequate workload distribution	167				
							
		Flaws in pilot requirements definition process and/or training methodology	168				
		Flaws in pilot requirements definition process and/or training methodology	168 448				
10	A126022	Lack of adherence to emergency procedures	448	7. 0.	24. 25	28: 20: 20: 40:	48.50.51.54.55.5
10	AL26B32	Lack of adherence to emergency procedures System failures that may affect braking devices (ground spoilers, brakes / autobrake,	448	7; 9;	24; 25	28; 29; 30; 40;	48; 50; 51; 54; 55; 5
10	AL26B32	Lack of adherence to emergency procedures System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)	448 15	7; 9;	24; 25	28; 29; 30; 40;	48; 50; 51; 54; 55; 5 59; 60; 61; 62;
10	AL26B32	Lack of adherence to emergency procedures System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition	448	7; 9;	24; 25	28; 29; 30; 40;	
10	AL26B32	Lack of adherence to emergency procedures System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	148 15 149	7; 9;	24; 25	28; 29; 30; 40;	
10	AL26B32	Lack of adherence to emergency procedures System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	448 15	7; 9;	24; 25	28; 29; 30; 40;	
10	AL26B32	Lack of adherence to emergency procedures System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	149 150	7; 9;	24; 25	28; 29; 30; 40;	
10	AL26B32	Lack of adherence to emergency procedures System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	148 15 149	7; 9;	24; 25	28; 29; 30; 40;	
10	AL26B32	Lack of adherence to emergency procedures System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	149 150	7; 9;	24; 25	28; 29; 30; 40;	
10	AL26B32	Lack of adherence to emergency procedures System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Convective weather encounter	149 150 18	7; 9;	24; 25	28; 29; 30; 40;	
10	AL26B32	Lack of adherence to emergency procedures System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly	149 150 18 116	7; 9;	24; 25	28; 29; 30; 40;	
10	AL26B32	Lack of adherence to emergency procedures System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout	149 150 18 116 120	7; 9;	24; 25	28; 29; 30; 40;	
100	AL26B32	Lack of adherence to emergency procedures System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness	149 150 18 116 120 6	7; 9;	24; 25	28; 29; 30; 40;	
100	AL26832	Lack of adherence to emergency procedures System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness High energy approach due to lack of adequate planning or due to challenging design of	149 150 18 116 120	7; 9;	24; 25	28; 29; 30; 40;	
100	AL26B32	Lack of adherence to emergency procedures System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent,	149 150 18 116 120 6	7; 9;	24; 25	28; 29; 30; 40;	
100	AL26B32	Lack of adherence to emergency procedures System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-allitudes,) or challenging ATC instructions (late descent, vectors, allitude or speed restrictions,)	149 150 18 116 120 6 413	7; 9;	24; 25	28; 29; 30; 40;	
100	AL26B32	Lack of adherence to emergency procedures System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing	149 150 18 116 120 6 413	7; 9;	24; 25	28; 29; 30; 40;	
100	AL26B32	Lack of adherence to emergency procedures System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Failure to remember / assess crosswind component limit for prevailing runway	149 150 18 116 120 6 413	7; 9;	24; 25	28; 29; 30; 40;	
100	AL26B32	Lack of adherence to emergency procedures System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Failure to remember / assess crosswind component limit for prevailing runway condition	149 150 18 116 120 6 413 414 418	7; 9;	24; 25	28; 29; 30; 40;	
100	AL26B32	Lack of adherence to emergency procedures System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Failure to remember / assess crosswind component limit for prevailing runway condition Inappropriate selection of autobrake mode for given runway length and condition	149 150 18 116 120 6 413 414 418	7; 9;	24; 25	28; 29; 30; 40;	
100	AL26B32	Lack of adherence to emergency procedures System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Failure to remember / assess crosswind component limit for prevailing runway condition Inadequate crosswind landing / decrab technique	149 150 150 18 116 120 6 413 414 418 178 425	7; 9;	24; 25	28; 29; 30; 40;	
100	AL26B32	Lack of adherence to emergency procedures System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Failure to remember / assess crosswind component limit for prevailing runway condition Inappropriate selection of autobrake mode for given runway length and condition	149 150 18 116 120 6 413 414 418	7; 9;	24; 25	28; 29; 30; 40;	
100	AL26B32	Lack of adherence to emergency procedures System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Failure to remember / assess crosswind component limit for prevailing runway condition Inadequate crosswind landing / decrab technique	149 150 150 18 116 120 6 413 414 418 178 425	7; 9;	24; 25	28; 29; 30; 40;	
100	AL26B32	Lack of adherence to emergency procedures System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Failure to remember / assess crosswind component limit for prevailing runway condition Inappropriate selection of autobrake mode for given runway length and condition Inappropriate selection of everse thrust	149 150 18 116 120 6 413 414 418 425 427	7; 9;	24; 25	28; 29; 30; 40;	
100	AL26B32	Lack of adherence to emergency procedures System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Failure to remember / assess crosswind component limit for prevailing runway condition Inappropriate selection of autobrake mode for given runway length and condition inadequate crosswind landing / decrab technique Touchdown off centerline Delayed selection of reverse thrust Inappropriate use of differential reverse thrust	149 150 18 116 120 6 413 414 418 425 427 175 430	7; 9;	24; 25	28; 29; 30; 40;	
100	AL26B32	Lack of adherence to emergency procedures System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Failure to remember / assess crosswind component limit for prevailing runway condition Inappropriate selection of autobrake mode for given runway length and condition Inadequate crosswind landing / decrab technique Touchdown off centerline Delayed selection of reverse thrust Late activation of pedal braking or takeover from autobrake, when so required	149 150 18 116 120 6 413 414 418 178 425 427 175 430 174	7; 9;	24; 25	28; 29; 30; 40;	
100	AL26B32	Lack of adherence to emergency procedures System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), elither intentionally or unknowingly Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Failure to remember / assess crosswind component limit for prevailing runway condition Inappropriate selection of autobrake mode for given runway length and condition Inadequate crosswind landing / decrab technique Touchdown off centerline Delayed selection of reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Inadequate use of differential braking	1448 15 149 150 18 116 6 413 414 418 425 427 427 430 174 432	7; 9;	24; 25	28; 29; 30; 40;	
100	AL26B32	Lack of adherence to emergency procedures System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-allitudes,) or challenging ATC instructions (late descent, vectors, allitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Failure to remember / assess crosswind component limit for prevailing runway condition Inappropriate selection of autobrake mode for given runway length and condition Inappropriate selection of reverse thrust Inappropriate use of differential reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Inadequate use of differential braking Use of nose wheel steering tiller during rollout	149 150 18 116 120 6 413 414 418 425 427 175 430 174 432 433	7; 9;	24; 25	28; 29; 30; 40;	
10	AL26B32	Lack of adherence to emergency procedures System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Failure to remember / assess crosswind component limit for prevailing runway condition Inappropriate selection of autobrake mode for given runway length and condition inadequate crosswind landing / decrab technique Touchdown off centerline Delayed selection of reverse thrust Inappropriate use of differential reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Inadequate use of differential braking Use of nose wheel steering tiller during rollout Lack of adherence to SOP in terms of approach and landing	1448 150 149 150 18 116 116 413 414 418 178 425 427 175 430 433 433 245	7; 9;	24; 25	28; 29; 30; 40;	
100	AL26B32	Lack of adherence to emergency procedures System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Failure to remember / assess crosswind component limit for prevailing runway condition Inappropriate selection of autobrake mode for given runway length and condition Inappropriate selection of autobrake mode for given runway length and condition Inappropriate use of differential everse thrust Late activation of pedal braking or takeover from autobrake, when so required inadequate use of differential reverse thrust Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution	1448 150 149 150 18 116 413 414 418 425 427 175 430 174 432 433 245 167	7; 9;	24; 25	28; 29; 30; 40;	
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100	AL26B32	Lack of adherence to emergency procedures System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Failure to remember / assess crosswind component limit for prevailing runway condition Inappropriate selection of autobrake mode for given runway length and condition Inappropriate selection of autobrake mode for given runway length and condition Inappropriate use of differential everse thrust Late activation of pedal braking or takeover from autobrake, when so required inadequate use of differential reverse thrust Lack of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution	1448 150 149 150 18 116 413 414 418 425 427 175 430 174 432 433 245 167	7; 9;	24; 25	28; 29; 30; 40;	
100	AL26B32	Lack of adherence to emergency procedures System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Failure to remember / assess crosswind component limit for prevailing runway condition Inappropriate selection of autobrake mode for given runway length and condition Inadequate crosswind landing / decrab technique Touchdown off centerline Delayed selection of reverse thrust Inappropriate use of differential reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Inadequate use of differential braking Use of nose wheel steering tiller during rollout Lack of adherence to SOP in terms of approach and landing Pilott triendens - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	149 150 18 116 120 6 413 414 418 178 425 427 175 430 174 432 433 167 168	7; 9;	24; 25	28; 29; 30; 40;	
100	AL26B32	Lack of adherence to emergency procedures System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers) Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Convective weather encounter Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly Temporary loss of directional control during rollout Adverse weather / poor visibility conditions / darkness High energy approach due to lack of adequate planning or due to challenging design of STAR (high fix-crossing-altitudes,) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions,) Late deceleration and configuration set-up for approach and landing Failure to remember / assess crosswind component limit for prevailing runway condition Inappropriate selection of autobrake mode for given runway length and condition Inappropriate selection of everse thrust Inappropriate use of differential reverse thrust Inappropriate use of differential reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Inadequate use of differential reverse thrust Late activation of pedal braking or takeover from autobrake, when so required Inadequate use of differential treverse thrust Late of adherence to SOP in terms of approach and landing Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP in terms of briefing and checklist before initiating of	149 150 18 116 120 6 413 414 418 178 425 427 175 430 174 432 433 167 168	7; 9;	24; 25	28; 29; 30; 40;	
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3 AL	L27B113	distribution Tire burst Contaminated Runway Bird strike Wildlife incursion Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition	39 34 5 216	7;	23;		55; 58; 59; 60; 61; 62;
		distribution Tire burst Contaminated Runway Bird strike Wildlife incursion Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	39 34 5 216 162 129				55; 58; 59; 60; 61; 62; 63
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		distribution Tire burst Contaminated Runway Bird strike Wildlife incursion Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Flaws in aircraft system maintenance process definition - Landing gear components.	39 34 5 216 162 129 130				55; 58; 59; 60; 61; 62; 63
		distribution Tire burst Contaminated Runway Bird strike Wildlife incursion Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in maintenance technician / airworthiness specialist requirements definition	39 34 5 216 162 129				55; 58; 59; 60; 61; 62; 63 50; 51; 54; 55; 58; 59;
		distribution Tire burst Contaminated Runway Bird strike Wildlife incursion Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Flaws in aircraft system maintenance process definition - Landing gear components.	39 34 5 216 162 129 130				55; 58; 59; 60; 61; 62; 63 50; 51; 54; 55; 58; 59;
		distribution Tire burst Contaminated Runway Bird strike Wildlife incursion Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in maintenance technician / airworthiness specialist requirements definition	39 34 5 216 162 129 130				55; 58; 59; 60; 61; 62; 63 50; 51; 54; 55; 58; 59;
		distribution Tire burst Contaminated Runway Bird strike Wildlife incursion Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	39 34 5 216 162 129 130 377				55; 58; 59; 60; 61; 62; 63 50; 51; 54; 55; 58; 59;
4 AL		distribution Tire burst Contaminated Runway Bird strike Wildlife incursion Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	39 34 5 216 162 129 130 377	7;			55; 58; 59; 60; 61; 62; 63 50; 51; 54; 55; 58; 59;
4 AL	L27B114	distribution Tire burst Contaminated Runway Bird strike Wildlife incursion Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification	39 34 5 216 162 129 130 377 149	7;			55; 58; 59; 60; 61; 62; 63 50; 51; 54; 55; 58; 59; 60; 61; 62;
4 AL	L27B114	distribution Tire burst Contaminated Runway Bird strike Wildlife incursion Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	39 34 5 216 162 129 130 377 149	7;			55; 58; 59; 60; 61; 62; 63 50; 51; 54; 55; 58; 59; 60; 61; 62; 50; 51; 54; 55; 58; 59;
4 AL	L27B114	distribution Tire burst Contaminated Runway Bird strike Wildlife incursion Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	39 34 5 216 162 129 130 377 149 150	7;			55; 58; 59; 60; 61; 62; 63 50; 51; 54; 55; 58; 59; 60; 61; 62; 50; 51; 54; 55; 58; 59; 60; 61; 62;
4 AL	L27B114	distribution Tire burst Contaminated Runway Bird strike Wildlife incursion Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tredurements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components System failure affecting the operation of primary instruments / displays or standby	39 34 5 216 162 129 130 377 149	7;			55; 58; 59; 60; 61; 62; 63 50; 51; 54; 55; 58; 59; 60; 61; 62; 50; 51; 54; 55; 58; 59; 60; 61; 62; 50; 51; 54; 55; 58; 59;
4 AL	L27B114	distribution Tire burst Contaminated Runway Bird strike Wildlife incursion Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components System failure affecting the operation of primary instruments / displays or standby instruments	39 34 5 216 162 129 130 377 149 150 358	7;			55; 58; 59; 60; 61; 62; 63 50; 51; 54; 55; 58; 59; 60; 61; 62; 50; 51; 54; 55; 58; 59; 60; 61; 62;
4 AL	L27B114	distribution Tire burst Contaminated Runway Bird strike Wildlife incursion Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components System failure affecting the operation of primary instruments / displays or standby instruments Flaws in aircraft system maintenance process definition - Landing gear components.	39 34 5 216 162 129 130 377 149 150 358	7;			55; 58; 59; 60; 61; 62; 63 50; 51; 54; 55; 58; 59; 60; 61; 62; 50; 51; 54; 55; 58; 59; 60; 61; 62; 50; 51; 54; 55; 58; 59; 60; 61; 62;
4 AL	L27B114	distribution Tire burst Contaminated Runway Bird strike Wildlife incursion Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components System failure affecting the operation of primary instruments / displays or standby instruments Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in aircraft system maintenance process definition - Landing gear components.	39 34 5 216 162 129 130 377 149 150 358	7;			55; 58; 59; 60; 61; 62; 63 50; 51; 54; 55; 58; 59; 60; 61; 62; 50; 51; 54; 55; 58; 59; 60; 61; 62; 50; 51; 54; 55; 58; 59; 60; 61; 62;
4 AL	L27B114	distribution Tire burst Contaminated Runway Bird strike Wildlife incursion Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components System failure affecting the operation of primary instruments / displays or standby instruments Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	39 34 5 216 162 129 130 377 149 150 358 26	7;			55; 58; 59; 60; 61; 62; 63 50; 51; 54; 55; 58; 59; 60; 61; 62; 50; 51; 54; 55; 58; 59; 60; 61; 62; 50; 51; 54; 55; 58; 59; 60; 61; 62;
4 AL	L27B114	distribution Tire burst Contaminated Runway Bird strike Wildlife incursion Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components System failure affecting the operation of primary instruments / displays or standby instruments Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in aircraft system maintenance process definition - Landing gear components.	39 34 5 216 162 129 130 377 149 150 358	7;			55; 58; 59; 60; 61; 62; 63 50; 51; 54; 55; 58; 59; 60; 61; 62; 50; 51; 54; 55; 58; 59; 60; 61; 62; 50; 51; 54; 55; 58; 59;
4 AL	L27B114	distribution Tire burst Contaminated Runway Bird strike Wildlife incursion Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components System failure affecting the operation of primary instruments / displays or standby instruments Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	39 34 5 216 162 129 130 377 149 150 358 26	7;			55; 58; 59; 60; 61; 62; 63 50; 51; 54; 55; 58; 59; 60; 61; 62; 50; 51; 54; 55; 58; 59; 60; 61; 62; 50; 51; 54; 55; 58; 59; 60; 61; 62;
4 AL	L27B114	distribution Tire burst Contaminated Runway Bird strike Wildlife incursion Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components System failure affecting the operation of primary instruments / displays or standby instruments Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	39 34 5 216 162 129 130 377 149 150 26 377 149	7;			55; 58; 59; 60; 61; 62; 63 50; 51; 54; 55; 58; 59; 60; 61; 62; 50; 51; 54; 55; 58; 59; 60; 61; 62; 50; 51; 54; 55; 58; 59;
4 AL	L278114 L278115	distribution Tire burst Contaminated Runway Bird strike Wildlife incursion Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components System failure affecting the operation of primary instruments / displays or standby instruments Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tredness - Inadequate workload distribution Tire burst	39 34 5 216 162 129 130 377 149 150 26 377 149	7;			55; 58; 59; 60; 61; 62; 63 50; 51; 54; 55; 58; 59; 60; 61; 62; 50; 51; 54; 55; 58; 59; 60; 61; 62; 50; 51; 54; 55; 58; 59; 60; 61; 62;
4 AL	L27B114	distribution Tire burst Contaminated Runway Bird strike Wildlife incursion Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components System failure affecting the operation of primary instruments / displays or standby instruments Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	39 34 5 216 162 129 130 377 149 150 26 377 149	7;			55; 58; 59; 60; 61; 62; 63 50; 51; 54; 55; 58; 59; 60; 61; 62; 50; 51; 54; 55; 58; 59; 60; 61; 62; 50; 51; 54; 55; 58; 59; 60; 61; 62; 49; 50; 51; 52; 53; 54;
4 AL	L278114 L278115	distribution Tire burst Contaminated Runway Bird strike Wildlife incursion Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components System failure affecting the operation of primary instruments / displays or standby instruments Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tredness - Inadequate workload distribution Tire burst	39 34 5 216 162 129 130 377 149 150 26 377 149	7;			55; 58; 59; 60; 61; 62; 63 50; 51; 54; 55; 58; 59; 60; 61; 62; 50; 51; 54; 55; 58; 59; 60; 61; 62; 50; 51; 54; 55; 58; 59; 60; 61; 62;
4 AL	L278114 L278115	distribution Tire burst Contaminated Runway Bird strike Wildlife incursion Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components System failure affecting the operation of primary instruments / displays or standby instruments Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tredness - Inadequate workload distribution Tire burst	39 34 5 216 162 129 130 377 149 150 26 377 149	7;			55; 58; 59; 60; 61; 62; 63 50; 51; 54; 55; 58; 59; 60; 61; 62; 50; 51; 54; 55; 58; 59; 60; 61; 62; 50; 51; 54; 55; 58; 59; 60; 61; 62; 49; 50; 51; 52; 53; 54;



	Wildlife incursion	5				
	Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence	401				
	integrity monitoring	246				
	Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of	216				
	contaminations. Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction	162				
	procedure	102				
	Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	129				
	distribution					
	Flaws in vehicle driver / equipment operator / ground agent requirements definition	130				
	process and/or training methodology					
8 AL27B123	Flaws in aircraft system maintenance process definition - Landing gear components.	377	7;			50; 51; 54; 55; 58; 5
						60; 61; 62;
	Flaws in maintenance technician / airworthiness specialist requirements definition	149				
	process and/or training methodology					
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
	distribution					
9 AL27B124	Tire burst	80	7;			50; 51; 54; 55; 58; 5
_	Contestinated Discussion	39				60; 61; 62;
	Contaminated Runway System failure affecting the operation of primary instruments / displays or standby	26				
	instruments	20				
	Wildlife incursion	5				
	Flaws in aircraft system maintenance process definition - Landing gear components.	377				
	Flaws in maintenance technician / airworthiness specialist requirements definition	149				
	process and/or training methodology					
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
1	distribution	-				
	Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence	401				
	integrity monitoring					
	Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of	216				
	contaminations.					
	Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload	129				
	distribution	_				
	Flaws in vehicle driver / equipment operator / ground agent requirements definition	130				
	process and/or training methodology		_			
10 AL27B125	Inadequate certification process and / or flaws in methodology concerning verification	358	/;			FO. F1. F4. FF. F0. I
	of the system / product compliance with requirements - Landing gear components					50; 51; 54; 55; 58;
11	Flight crew fails to maintain control					60; 61; 62;
11 AL27B21	not identifiable at the moment		7;	23;	40;	49; 50; 51; 52; 53; !
11 ALZ/021	not identifiable at the moment		, , , , , , , , , , , , , , , , , , ,	23,	40,	55; 58; 59; 60; 61; 6
						63
	Tire burst	80				
	Contaminated Runway	39				
	Bird strike	34				
	System failure affecting the operation of primary instruments / displays or standby	26				
	instruments					
	Wildlife incursion	5				
	Flaws in aircraft system maintenance process definition - Landing gear components.	377				
	Flaws in manufacturer quality control process - Landing gear components.	376				
	Flaws in manufacturer quality control process - Landing gear components. Flaws in maintenance technician / airworthiness specialist requirements definition	_				
	Flaws in manufacturer quality control process - Landing gear components. Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	376 149				
	Flaws in manufacturer quality control process - Landing gear components. Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	376				
	Flaws in manufacturer quality control process - Landing gear components. Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	376 149 150				
	Flaws in manufacturer quality control process - Landing gear components. Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification	376 149				
	Flaws in manufacturer quality control process - Landing gear components. Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	376 149 150				
	Flaws in manufacturer quality control process - Landing gear components. Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	376 149 150 358				
	Flaws in manufacturer quality control process - Landing gear components. Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence	376 149 150				
	Flaws in manufacturer quality control process - Landing gear components. Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	376 149 150 358 401				
	Flaws in manufacturer quality control process - Landing gear components. Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of	376 149 150 358 401				
	Flaws in manufacturer quality control process - Landing gear components. Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.	376 149 150 358 401				
	Flaws in manufacturer quality control process - Landing gear components. Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of	376 149 150 358 401 216				
	Flaws in manufacturer quality control process - Landing gear components. Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction	376 149 150 358 401 216				
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13 AL27B23	process and/or training methodology Pilot tiredness - Inadequate workload distribution	167	7.	23;	40;	49; 50; 51; 52; 53; 54
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	Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129				
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14 AL27B24	Pilot tiredness - Inadequate workload distribution	167	7;	23;	40;	49; 50; 51; 52; 53; 54 55; 58; 59; 60; 61; 62 63
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SPIs: System of

ESD1	Code Code	Identifiable precursors identifiable precursors	No.	SPIs: Technology Technology	SPIs: Human Human	SPIs: Organisation Organisation	SPIs: System of Organisations System of Organisations
1	TO01B11	Aircraft System Failure System failure affecting the operation of primary instruments / displays or standby instruments	26	1; 3; 9;	13; 18; 21; 22;	31; 41;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63
		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149				00, 01, 02, 03
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150				
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299				
		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)	306				
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine	316				
		Flaws in manufacturer quality control process - Autothrottle system in the engine. Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.	324 325				
		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)	410				
2	TO01B12	Prolonged loss of communications (PLOC) between pilot and controller(s)	53		11; 18; 19; 20; 21; 22;	31; 32; 33; 43;	45; 47; 50; 51; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
		Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll	98				
		Lack of or poor communication quality Flaws in maintenance technician / airworthiness specialist requirements definition	146 149				
		process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
		distribution Flaws in aircraft system maintenance process definition - Communication equipment systems and components.	270				
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.	271				
		Flaws in manufacturer quality control process - Communication equipment systems and components.	272				
3	TO01B13	System failure affecting the operation of primary instruments / displays or standby instruments	26	1; 2; 3; 8;	13; 14; 15; 19; 20; 22;	32; 33; 34; 35;	47; 50; 51; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149				
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150				
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components	230				
		Flaws in manufacturer quality control process - Power supply system components Flaws in aircraft system maintenance process definition - Power supply system components	238 387				
4	TO01B14	System failure affecting the operation of primary instruments / displays or standby instruments	26		13; 14; 22;	41; 42;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63
		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149				
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150				
		Flaws in aircraft system maintenance process definition - Fire detection system components	474				
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components	475				
		Flaws in manufacturer quality control process - Fire detection system components Flaws in aircraft system maintenance process definition - Fire warning system	476 477				
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system	478				
		Flaws in manufacturer quality control process - Fire warning system	479				
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components	480				
		Flaws in aircraft system maintenance process definition - Fire extinguishing system components	481				
		Flaws in manufacturer quality control process - Fire extinguishing system components	482				
5	TO01B15	System failure affecting aircraft configuration, controllability and/or flying qualities	25	3; 5; 7;	13; 14; 22;	41; 42;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63
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Code	Identifiable precursors		SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
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	Flaws in aircraft system maintenance process definition - Hydraulic System	334				
	Flaws in manufacturer quality control process -Hydraulic system components.	386				
6 TO01B16	System failure affecting the operation of primary instruments / displays or standby	26	3;	13; 14; 22;	41; 42;	47; 50; 51; 54; 55; 5
	instruments	4.40				59; 60; 61; 62; 63
	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149				
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
	distribution					
	Inadequate certification process and / or flaws in methodology concerning verification	385				
	of the system / product compliance with requirements - other critical flight instruments					
+	and systems. Flaws in aircraft system maintenance process definition - other critical flight	383				
	instruments and systems.	303				
7 TO01B17	System failure affecting the operation of primary instruments / displays or standby	26	8;	15; 18; 19; 20; 21;	31; 32; 33; 34; 35; 36;	47; 50; 51; 54; 55; 5
	instruments				37; 38; 39;	59; 60; 61; 62; 63
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	Flaws in aircraft system maintenance process definition - Onboard navigational systems	491				
+	and components Inadequate certification process and / or flaws in methodology concerning verification	402				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems	492				
	and components.					
	Flaws in manufacturer quality control process - Onboard navigational systems and	493				
	components.	$oxed{oxed}$				
8 TO01B18	System failure affecting aircraft configuration, controllability and/or flying qualities	25	2;			50; 51; 54; 55; 58;
_	Flaws in maintenance technician / airworthiness specialist requirements definition	149				60; 61; 62; 63
	process and/or training methodology	149				
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
	distribution					
	Inadequate certification process and / or flaws in methodology concerning verification	464				
	of the system / product compliance with requirements - APU systems and / or					
	components Flaws in manufacturer quality control process - APU systems and / or components	465				
	Flaws in aircraft system maintenance process definition - APU systems and / or	466				
	components					
9 TO01B19	System failure affecting aircraft configuration, controllability and/or flying qualities	25	3; 5;	13; 14; 22;	36; 37; 38; 39; 41; 42;	50; 51; 54; 55; 58;
	Flaws in maintenance technician / airworthiness specialist requirements definition	149				60; 61; 62; 63
	process and/or training methodology	149				
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
	distribution					
	Inadequate certification process and / or flaws in methodology concerning verification	288				
	of the system / product compliance with requirements - Components of Wing control					
	surface system. Flaws in aircraft system maintenance process definition - Components of Wing control	311				
	surface system.	311				
	Flaws in manufacturer quality control process - Components of Wing control surface	314				
	system.					
10 TO01B110	System failure affecting aircraft configuration, controllability and/or flying qualities	25	3;	13; 14; 22; 24;	28; 41; 42;	50; 51; 54; 55; 58;
+	Flaws in maintenance technician / airworthiness specialist requirements definition	149				60; 61; 62; 63
	process and/or training methodology	1.5				
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
	distribution					
	Inadequate certification process and / or flaws in methodology concerning verification	381				
	of the system / product compliance with requirements - Drag control system components.					
	Flaws in aircraft system maintenance process definition - Drag control system	379				
	components.	L			<u> </u>	<u> </u>
	Flaws in manufacturer quality control process - Drag control system componentss.	378				
11 TO01B111	System failure affecting aircraft configuration, controllability and/or flying qualities	25	7;	23;	26; 29;	50; 51; 54; 55; 58;
+	Landing gear retraction failure	63				60; 61; 62; 63
	Flaws in maintenance technician / airworthiness specialist requirements definition	149				
	process and/or training methodology	L				
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
1	distribution	0.5.5				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358				
	of the system / product compliance with requirements - Landing gear components					
	Flaws in aircraft system maintenance process definition - Landing gear components.	377				
	Flaws in manufacturer quality control process - Landing gear components.	376				
12 TO01B112	System failure affecting the operation of primary instruments / displays or standby	26	3; 9;	13; 21;	41;	50; 51; 54; 55; 58;
	instruments					60; 61; 62; 63
1	Engine failure	77			+	1
	Cabin pressure drop as a result of pneumatic system failure					
	Cabin pressure drop as a result of pneumatic system failure Flaws in maintenance technician / airworthiness specialist requirements definition	79 149				



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Flaws in aircraft system maintenance process definition - Pneumatic system 374 Flaws in manufacturer quality control process - Pneumatic system componentss 373 13 TO01B113 18; 21; 47: 50: 51: 54: 55: 58: 31; 32; 33; 34; 35; System failure affecting the operation of primary instruments / displays or standby 26 59; 60; 61; 62; 63 instruments Flaws in maintenance technician / airworthiness specialist requirements definition 149 process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 distribution Inadequate certification process and / or flaws in methodology concerning verification 391 of the system / product compliance with requirements - Aircraft door system and / or Inadequate certification process and / or flaws in methodology concerning verification 391 of the system / product compliance with requirements - Aircraft door system and / or components 50; 51; 54; 55; 58; 59; 14 TO01B114 System failure affecting aircraft configuration, controllability and/or flying qualities 4; 6; 22; 60; 61; 62; 63 System failure affecting the operation of primary instruments / displays or standby Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll 98 Flaws in maintenance technician / airworthiness specialist requirements definition 149 process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 distribution Inadequate certification process and / or flaws in methodology concerning verification 385 of the system / product compliance with requirements - other critical flight instrument and systems. Flaws in aircraft system maintenance process definition - other critical flight 383 instruments and systems. Take-off Rejection by Flight Crew 15 TO01B211 Pilot tiredness - Inadequate workload distribution 1; 2; 3; 4; 5; 6; 7; 8; 9; 11: 13: 14: 15: 18: 19: 26: 28: 29: 31: 32: 33: 45: 47: 50: 51: 54: 55: 20; 21; 22; 23; 24; 34; 35; 36; 37; 38; 39; 56; 57; 58; 59; 60; 61; 41; 42; 43; 62; 63 Flaws in pilot requirements definition process and/or training methodology 168 Poor application of T/O & RTO procedure, failure recognition and preparedness 209 System failure affecting aircraft configuration, controllability and/or flying qualities 25 System failure affecting the operation of primary instruments / displays or standby 26 Prolonged loss of communications (PLOC) between pilot and controller(s) 53 Landing gear retraction failure 63 Engine failure Cabin pressure drop as a result of pneumatic system failure 79 Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll 98 Lack of or poor communication quality 146 Flaws in maintenance technician / airworthiness specialist requirements definition 149 process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 Inadequate aircraft de-icing / anti-icing 180 nadequate certification process and / or flaws in methodology concerning verification 230 of the system / product compliance with requirements - Power supply system components Flaws in manufacturer quality control process - Power supply system components 238 Flaws in aircraft system maintenance process definition - Communication equipment 270 systems and components. nadequate certification process and / or flaws in methodology concerning verification 271 of the system / product compliance with requirements - Communication equipment systems and components. Flaws in manufacturer quality control process - Communication equipment systems 272 and components. Inadequate certification process and / or flaws in methodology concerning verification 288 of the system / product compliance with requirements - Components of Wing control surface system. nadequate certification process and / or flaws in methodology concerning verification 299 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) Flaws in manufacturer quality control process - FMS subsystem and components 306 (autopilot incl.) Flaws in aircraft system maintenance process definition - Components of Wing control urface system. Flaws in manufacturer quality control process - Components of Wing control surface 314 system. Inadequate certification process and / or flaws in methodology concerning verification 316 of the system / product compliance with requirements - Autothrottle system in the engine Navigation deviation 317 Flaws in manufacturer quality control process - Autothrottle system in the engine 324



SPIs: System of Code Identifiable precursors No. SPIs: Technology SPIs: Human SPIs: Organisation Organisations Flaws in aircraft system maintenance process definition - Autothrottle system in the 325 engine Inadequate certification process and / or flaws in methodology concerning verification 333 of the system / product compliance with requirements - Hydraulic system components Flaws in aircraft system maintenance process definition - Hydraulic System nadequate certification process and / or flaws in methodology concerning verification 358 of the system / product compliance with requirements - Landing gear components Flaws in aircraft system maintenance process definition - FMS subsystems and 410 components (autopilot incl.) nadequate certification process and / or flaws in methodology concerning verification 464 of the system / product compliance with requirements - APU systems and / or components Flaws in aircraft system maintenance process definition - APU systems and / or 466 components Flaws in aircraft system maintenance process definition - Fire detection system Inadequate certification process and / or flaws in methodology concerning verification 475 of the system / product compliance with requirements - Fire deection system components Flaws in manufacturer quality control process - Fire detection system components 476 Flaws in aircraft system maintenance process definition - Fire warning system 477 nadequate certification process and / or flaws in methodology concerning verification 178 of the system / product compliance with requirements - Fire warning system Flaws in manufacturer quality control process - Fire warning system nadequate certification process and / or flaws in methodology concerning verification 480 of the system / product compliance with requirements - Fire extinguishing system components Flaws in aircraft system maintenance process definition - Fire extinguishing system 481 components Flaws in manufacturer quality control process - Fire extinguishing system components 482 Flaws in aircraft system maintenance process definition - Onboard navigational systems 491 and components Inadequate certification process and / or flaws in methodology concerning verification 492 of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and 493 omponents. Inadequate certification process and / or flaws in methodology concerning verification 391 of the system / product compliance with requirements - Aircraft door system and / or components nadequate certification process and / or flaws in methodology concerning verification 391 of the system / product compliance with requirements - Aircraft door system and / or components Flaws in aircraft system maintenance process definition - Power supply system 387 components Flaws in manufacturer quality control process -Hydraulic system components. 386 nadequate certification process and / or flaws in methodology concerning verification 385 of the system / product compliance with requirements - other critical flight instruments and systems Flaws in aircraft system maintenance process definition - other critical flight 383 instruments and systems. nadequate certification process and / or flaws in methodology concerning verification 381 of the system / product compliance with requirements - Drag control system components. Flaws in aircraft system maintenance process definition - Drag control system 379 components. Flaws in manufacturer quality control process - Drag control system componentss. 378 Flaws in aircraft system maintenance process definition - Landing gear components 377 Flaws in manufacturer quality control process - Landing gear components. 376 Inadequate certification process and / or flaws in methodology concerning verification 375 of the system / product compliance with requirements - Pneumatic system components. Flaws in aircraft system maintenance process definition - Pneumatic system 374 omponents. Flaws in manufacturer quality control process - Pneumatic system componentss. 16 TO01B212 167 1; 2; 3; 4; 5; 6; 7; 8; 9; 11; 13; 14; 15; 18; 19; 26; 28; 29; 31; 32; 33; 45; 47; 50; 51; 54; 55; Pilot tiredness - Inadequate workload distribution 20; 21; 22; 23; 24; 34; 35; 36; 37; 38; 39; 56; 57; 58; 59; 60; 61; 41; 42; 43; Flaws in pilot requirements definition process and/or training methodology 168 Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision 207 System failure affecting aircraft configuration, controllability and/or flying qualities 25 System failure affecting the operation of primary instruments / displays or standby 26 nstruments Prolonged loss of communications (PLOC) between pilot and controller(s) 53 Landing gear retraction failure 63 Engine failure Cabin pressure drop as a result of pneumatic system failure Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll Lack of or poor communication quality 146



SPIs: System of Code Identifiable precursors SPIs: Technology SPIs: Human **SPIs: Organisation** Organisations Flaws in maintenance technician / airworthiness specialist requirements definition 149 process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 distribution Inadequate aircraft de-icing / anti-icing 180 nadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply syste Flaws in manufacturer quality control process - Power supply system components 238 Flaws in aircraft system maintenance process definition - Communication equipment 270 systems and components. nadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components. 272 Flaws in manufacturer quality control process - Communication equipment systems and components. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system. Inadequate certification process and / or flaws in methodology concerning verification 299 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) Flaws in manufacturer quality control process - FMS subsystem and components 306 autopilot incl.) Flaws in aircraft system maintenance process definition - Components of Wing control 311 surface system. Flaws in manufacturer quality control process - Components of Wing control surface nadequate certification process and / or flaws in methodology concerning verification 316 of the system / product compliance with requirements - Autothrottle system in the engine 317 Navigation deviation Flaws in manufacturer quality control process - Autothrottle system in the engine Flaws in aircraft system maintenance process definition - Autothrottle system in the 325 Inadequate certification process and / or flaws in methodology concerning verification 333 of the system / product compliance with requirements - Hydraulic system components Flaws in aircraft system maintenance process definition - Hydraulic System nadequate certification process and / or flaws in methodology concerning verification 358 of the system / product compliance with requirements - Landing gear components Flaws in aircraft system maintenance process definition - FMS subsystems and 410 components (autopilot incl.) nadequate certification process and / or flaws in methodology concerning verification 464 of the system / product compliance with requirements - APU systems and / or components Flaws in aircraft system maintenance process definition - APU systems and / or 466 components Flaws in aircraft system maintenance process definition - Fire detection system components Inadequate certification process and / or flaws in methodology concerning verification 475 of the system / product compliance with requirements - Fire deection system components Flaws in manufacturer quality control process - Fire detection system components 476 Flaws in aircraft system maintenance process definition - Fire warning system nadequate certification process and / or flaws in methodology concerning verification 478 of the system / product compliance with requirements - Fire warning system Flaws in manufacturer quality control process - Fire warning system 479 nadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components Flaws in aircraft system maintenance process definition - Fire extinguishing system 481 components Flaws in manufacturer quality control process - Fire extinguishing system components Flaws in aircraft system maintenance process definition - Onboard navigational systems 491 Inadequate certification process and / or flaws in methodology concerning verification 492 of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. nadequate certification process and / or flaws in methodology concerning verification 391 of the system / product compliance with requirements - Aircraft door system and / or components Inadequate certification process and / or flaws in methodology concerning verification 391 of the system / product compliance with requirements - Aircraft door system and / or components Flaws in aircraft system maintenance process definition - Power supply system 387 components

Flaws in manufacturer quality control process -Hydraulic system components.



SPIs: System of Code Identifiable precursors No. SPIs: Technology SPIs: Human **SPIs: Organisation** Organisations Inadequate certification process and / or flaws in methodology concerning verification 385 of the system / product compliance with requirements - other critical flight instrument: and systems. Flaws in aircraft system maintenance process definition - other critical flight 383 instruments and systems. Inadequate certification process and / or flaws in methodology concerning verification 381 of the system / product compliance with requirements - Drag control syste Flaws in aircraft system maintenance process definition - Drag control system 379 components. 378 Flaws in manufacturer quality control process - Drag control system componentss. Flaws in aircraft system maintenance process definition - Landing gear components Flaws in manufacturer quality control process - Landing gear components 376 Inadequate certification process and / or flaws in methodology concerning verification 375 of the system / product compliance with requirements - Pneumatic system components. Flaws in aircraft system maintenance process definition - Pneumatic system Flaws in manufacturer quality control process - Pneumatic system componentss 17 TO01B22 1; 2; 3; 4; 5; 6; 7; 8; 9; 11; 13; 14; 15; 18; 19; 26; 28; 29; 31; 32; 33; 45; 47; 50; 51; 54; 55; not identifiable at that level 34; 35; 36; 37; 38; 39; 56; 57; 58; 59; 60; 61; 20; 21; 22; 23; 24; 41; 42; 43; System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby 26 instruments Prolonged loss of communications (PLOC) between pilot and controller(s) 53 Landing gear retraction failure 63 Engine failure Cabin pressure drop as a result of pneumatic system failure 79 Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll 98 Lack of or poor communication quality 146 Flaws in maintenance technician / airworthiness specialist requirements definition 149 process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 distribution Inadequate aircraft de-icing / anti-icing 180 nadequate certification process and / or flaws in methodology concerning verification 230 of the system / product compliance with requirements - Power supply system components Flaws in manufacturer quality control process - Power supply system components 238 Flaws in aircraft system maintenance process definition - Communication equipment 270 systems and components. nadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components. Flaws in manufacturer quality control process - Communication equipment systems and components. Inadequate certification process and / or flaws in methodology concerning verification 288 of the system / product compliance with requirements - Components of Wing control surface system. Inadequate certification process and / or flaws in methodology concerning verification 299 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.) Flaws in aircraft system maintenance process definition - Components of Wing control 311 surface system Flaws in manufacturer quality control process - Components of Wing control surface 314 system. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine Navigation deviation Flaws in manufacturer quality control process - Autothrottle system in the engine. 324 Flaws in aircraft system maintenance process definition - Autothrottle system in the engine. nadequate certification process and / or flaws in methodology concerning verification 333 of the system / product compliance with requirements - Hydraulic system components 334 Flaws in aircraft system maintenance process definition - Hydraulic System nadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Flaws in aircraft system maintenance process definition - FMS subsystems and 410 components (autopilot incl.) Inadequate certification process and / or flaws in methodology concerning verification 464 of the system / product compliance with requirements - APU systems and / or Flaws in aircraft system maintenance process definition - APU systems and / or 466 components Flaws in aircraft system maintenance process definition - Fire detection system components

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Linking of precursors and SPIs



SPIs: System of Code Identifiable precursors No. SPIs: Technology SPIs: Human SPIs: Organisation Organisations Inadequate certification process and / or flaws in methodology concerning verification 475 of the system / product compliance with requirements - Fire deection system components Flaws in manufacturer quality control process - Fire detection system components 476 Flaws in aircraft system maintenance process definition - Fire warning system 477 nadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system Flaws in manufacturer quality control process - Fire warning system 479 Inadequate certification process and / or flaws in methodology concerning verification 480 of the system / product compliance with requirements - Fire extinguishing system components Flaws in aircraft system maintenance process definition - Fire extinguishing system 481 components Flaws in manufacturer quality control process - Fire extinguishing system components 482 Flaws in aircraft system maintenance process definition - Onboard navigational system nadequate certification process and / or flaws in methodology concerning verification 492 of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and components. nadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components nadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components Flaws in aircraft system maintenance process definition - Power supply system 387 components Flaws in manufacturer quality control process -Hydraulic system components. 386 nadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - other critical flight instru Flaws in aircraft system maintenance process definition - other critical flight 383 instruments and systems. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Drag control system Flaws in aircraft system maintenance process definition - Drag control system 379 components. Flaws in manufacturer quality control process - Drag control system componentss. 378 Flaws in aircraft system maintenance process definition - Landing gear components. 377 Flaws in manufacturer quality control process - Landing gear components. 376 nadequate certification process and / or flaws in methodology concerning verification 375 of the system / product compliance with requirements - Pneumatic system components. Flaws in aircraft system maintenance process definition - Pneumatic system 374 components. Flaws in manufacturer quality control process - Pneumatic system componentss 373 Failure to Achieve Maximum Braking 45; 47; 50; 51; 54; 55; 18 TO01B31 1: 2: 3: 4: 5: 6: 7: 8: 9: 11: 13: 14: 15: 18: 19: 26: 28: 29: 31: 32: 33: Convective weather - heavy rain resulted with wet RWY surface 56; 57; 58; 59; 60; 61; 20; 21; 22; 23; 24; 34; 35; 36; 37; 38; 39; 62; 63 41; 42; 43; Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology 168 Gross error in takeoff weight entry and/or in V1 / VR speeds assessment 179 Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY 203 surface condition. Snow / ice presence / or runway surface friction rate below minimum High energy RTO rate is an indicator of improper Operator's policy for T/O operations. 211 Poor application of T/O & RTO procedure, computation of T/O parameters 260 System failure affecting aircraft configuration, controllability and/or flying qualities 25 System failure affecting the operation of primary instruments / displays or standby Prolonged loss of communications (PLOC) between pilot and controller(s) 53 Landing gear retraction failure 63 Engine failure Cabin pressure drop as a result of pneumatic system failure Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll Lack of or poor communication quality 146 Flaws in maintenance technician / airworthiness specialist requirements definition 149 process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 distribution Inadequate aircraft de-icing / anti-icing 180 nadequate certification process and / or flaws in methodology concerning verification 230 of the system / product compliance with requirements - Power supply system components Flaws in manufacturer quality control process - Power supply system components Flaws in aircraft system maintenance process definition - Communication equipment 270



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Flaws in manufacturer quality control process - Components of Wing control surface system. Inadequate certification process and / or flaws in methodology concerning verification 316 of the system / product compliance with requirements - Autothrottle system in the engine 317 Navigation deviation Flaws in manufacturer quality control process - Autothrottle system in the engine. 324 Flaws in aircraft system maintenance process definition - Autothrottle system in the 325 engine. Inadequate certification process and / or flaws in methodology concerning verification 333 of the system / product compliance with requirements - Hydraulic system components Flaws in aircraft system maintenance process definition - Hydraulic System nadequate certification process and / or flaws in methodology concerning verification 358 of the system / product compliance with requirements - Landing gear components Flaws in aircraft system maintenance process definition - FMS subsystems and 410 components (autopilot incl.) nadequate certification process and / or flaws in methodology concerning verification 464 of the system / product compliance with requirements - APU systems and / or components 466 Flaws in aircraft system maintenance process definition - APU systems and / or components Flaws in aircraft system maintenance process definition - Fire detection system 474 components Inadequate certification process and / or flaws in methodology concerning verification 475 of the system / product compliance with requirements - Fire deection system components Flaws in manufacturer quality control process - Fire detection system components Flaws in aircraft system maintenance process definition - Fire warning system nadequate certification process and / or flaws in methodology concerning verification 478 of the system / product compliance with requirements - Fire warning system Flaws in manufacturer quality control process - Fire warning system 479 Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components Flaws in aircraft system maintenance process definition - Fire extinguishing system 481 components Flaws in manufacturer quality control process - Fire extinguishing system components Flaws in aircraft system maintenance process definition - Onboard navigational systems 491 and components Inadequate certification process and / or flaws in methodology concerning verification 492 of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and 493 components. Inadequate certification process and / or flaws in methodology concerning verification 391 of the system / product compliance with requirements - Aircraft door system and / or components Inadequate certification process and / or flaws in methodology concerning verification 391 of the system / product compliance with requirements - Aircraft door system and / or components 387 Flaws in aircraft system maintenance process definition - Power supply system components Flaws in manufacturer quality control process -Hydraulic system components. nadequate certification process and / or flaws in methodology concerning verification 385 of the system / product compliance with requirements - other critical flight instrument and systems Flaws in aircraft system maintenance process definition - other critical flight 383 instruments and systems. nadequate certification process and / or flaws in methodology concerning verification 381 of the system / product compliance with requirements - Drag control system components. Flaws in aircraft system maintenance process definition - Drag control system 379 components. Flaws in manufacturer quality control process - Drag control system componentss. Flaws in aircraft system maintenance process definition - Landing gear components. 377 Flaws in manufacturer quality control process - Landing gear components. 376



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Flaws in manufacturer quality control process - Onboard navigational systems and components. nadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components nadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components Flaws in aircraft system maintenance process definition - Power supply system 387 components Flaws in manufacturer quality control process -Hydraulic system components. 386 nadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - other critical flight instru Flaws in aircraft system maintenance process definition - other critical flight 383 instruments and systems. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Drag control system Flaws in aircraft system maintenance process definition - Drag control system 379 components. Flaws in manufacturer quality control process - Drag control system componentss. 378 Flaws in aircraft system maintenance process definition - Landing gear components. 377 Flaws in manufacturer quality control process - Landing gear components. 376 nadequate certification process and / or flaws in methodology concerning verification 375 of the system / product compliance with requirements - Pneumatic system components. Flaws in aircraft system maintenance process definition - Pneumatic system 374 components Flaws in manufacturer quality control process - Pneumatic system componentss 373 Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision 207 Poor application of T/O & RTO procedure, failure recognition and preparedness 20 TO01B33 Pilot tiredness - Inadequate workload distribution 167 1; 2; 3; 4; 5; 6; 7; 8; 9; 11; 13; 14; 15; 18; 19; 26; 28; 29; 30; 31; 32; 45; 47; 50; 51; 54; 55; 20: 21: 22: 23: 24: 33; 34; 35; 36; 37; 38; 56; 57; 58; 59; 60; 61; 39; 41; 42; 43; 62; 63 Flaws in pilot requirements definition process and/or training methodology 168 Poor application of T/O & RTO procedure, braking initiation sequence 199 System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby 26 instruments Prolonged loss of communications (PLOC) between pilot and controller(s) 53 Landing gear retraction failure Engine failure Cabin pressure drop as a result of pneumatic system failure Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll 98 Lack of or poor communication quality 146 Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 distribution 180 Inadequate aircraft de-icing / anti-icing nadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system Flaws in manufacturer quality control process - Power supply system components 238 Flaws in aircraft system maintenance process definition - Communication equipment 270 systems and components. nadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment



SPIs: System of Code Identifiable precursors No. SPIs: Technology SPIs: Human **SPIs: Organisation** Organisations Flaws in manufacturer quality control process - Communication equipment systems and components. Inadequate certification process and / or flaws in methodology concerning verification 288 of the system / product compliance with requirements - Components of Wing control surface system. Inadequate certification process and / or flaws in methodology concerning verification 299 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.) Flaws in manufacturer quality control process - FMS subsystem and components 306 (autopilot incl.) Flaws in aircraft system maintenance process definition - Components of Wing control 311 surface system. Flaws in manufacturer quality control process - Components of Wing control surface 314 svstem. Inadequate certification process and / or flaws in methodology concerning verification 316 of the system / product compliance with requirements - Autothrottle system in the engine Navigation deviation 317 Flaws in manufacturer quality control process - Autothrottle system in the engine 324 Flaws in aircraft system maintenance process definition - Autothrottle system in the 325 engine Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components Flaws in aircraft system maintenance process definition - Hydraulic System 334 Inadequate certification process and / or flaws in methodology concerning verification 358 of the system / product compliance with requirements - Landing gear components Flaws in aircraft system maintenance process definition - FMS subsystems and 410 components (autopilot incl.) Inadequate certification process and / or flaws in methodology concerning verification 464 of the system / product compliance with requirements - APU systems and / or components Flaws in aircraft system maintenance process definition - APU systems and / or 466 Flaws in aircraft system maintenance process definition - Fire detection system 474 components Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components Flaws in manufacturer quality control process - Fire detection system components 476 Flaws in aircraft system maintenance process definition - Fire warning system 477 nadequate certification process and / or flaws in methodology concerning verification 478 of the system / product compliance with requirements - Fire warning system Flaws in manufacturer quality control process - Fire warning system 479 Inadequate certification process and / or flaws in methodology concerning verification 480 of the system / product compliance with requirements - Fire extinguishing system components Flaws in aircraft system maintenance process definition - Fire extinguishing system 481 components Flaws in manufacturer quality control process - Fire extinguishing system components 482 Flaws in aircraft system maintenance process definition - Onboard navigational systems 491 and components nadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components. Flaws in manufacturer quality control process - Onboard navigational systems and 493 components. nadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components Inadequate certification process and / or flaws in methodology concerning verification 391 of the system / product compliance with requirements - Aircraft door system and / or components Flaws in aircraft system maintenance process definition - Power supply system 387 omponents Flaws in manufacturer quality control process -Hydraulic system components. 386 nadequate certification process and / or flaws in methodology concerning verification 385 of the system / product compliance with requirements - other critical flight instru and systems 383 Flaws in aircraft system maintenance process definition - other critical flight instruments and systems. 381 nadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Drag control system components Flaws in aircraft system maintenance process definition - Drag control system 379 components. Flaws in manufacturer quality control process - Drag control system componentss 378 Flaws in aircraft system maintenance process definition - Landing gear components 377 376 Flaws in manufacturer quality control process - Landing gear components. nadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Pneumatic system



	Code	Identifiable precursors		SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
		Flaws in aircraft system maintenance process definition - Pneumatic system components.	374				
		Flaws in manufacturer quality control process - Pneumatic system componentss.	373				
		Pilot tiredness - Inadequate workload distribution	167				
		Flaws in pilot requirements definition process and/or training methodology	168				
		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207				
		Poor application of T/O & RTO procedure, failure recognition and preparedness	209				
ESD 2	Code	identifiable precursors	No.	Technology	Human	Organisation	System of
		Air Traffic related event					Organisations
1	TO02B11111	Convective weather / turbulence / windshear or crosswind conditions during take-off	32		14; 20; 22;	32; 33; 34; 35; 42;	47; 48; 50; 51; 54; 5
		•			, , ,	, , , , , , , ,	56; 57; 59; 60; 61; 6
		Traffic controller tiredness - Inadequate workload distribution	137				
		Inefficient / confusing TWR traffic control procedures, inefficient management of hot	139				
		spots Flaws in traffic controller requirements definition process and/or training methodology	145		+		
2	TO02B11112	Lack of English proficiency	132		11; 14; 20; 22;	32; 33; 34; 35; 42; 43; 44	45; 47; 48; 50; 51; 5 55; 56; 57; 59; 60; 6 62; 63
		Incorrect or confusing / misleading ATC instructions	133				
		Use of non-standard phraseology by pilot and/or controller	134				
		Traffic controller tiredness - Inadequate workload distribution	137				
		Flaws in traffic controller requirements definition process and/or training methodology	145				
		Lack of or poor communication quality	146				
		Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	148				
		driver	.				
		Pilot tiredness - Inadequate workload distribution	167				
		Flaws in pilot requirements definition process and/or training methodology	168		11 10 00 00		
3	TO02B1112	Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.	142		11; 19; 20; 22;	32; 33; 34; 35; 43; 44	45; 47; 50; 51; 54; 56; 57; 59; 60; 61; 63
		Pilot tiredness - Inadequate workload distribution	167				
		Flaws in pilot requirements definition process and/or training methodology	168				
	T002011211	Lack of adherence to Rules of the Air - adherence to Controller clearance	296		11, 10, 22,	22. 24. 42. 44	45, 50, 51, 54, 55,
4	TO02B11211	Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications	140		11; 19; 22;	32; 34; 43; 44	45; 50; 51; 54; 55; 57; 59; 60; 61; 62;
		Lack of adherence to SOP for GND movements. Lack of awareness of own position on	142				37, 33, 00, 01, 02,
		the airsite and airport topology.					
		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient	143				
		separation / clearence					
		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current	144				
		situation on the airsite or / and aircraft / vehicle proximity Pilot tiredness - Inadequate workload distribution	167				
		Flaws in pilot requirements definition process and/or training methodology	168				
		Lack of adherence to Rules of the Air - adherence to Controller clearance	296				
		Taxiing without clearance	367				
5	TO02B11212	Emergency landing	8		11; 19; 20; 22; 23;	32; 33; 34; 43; 44	45; 47; 50; 51; 54; 56; 57; 59; 60; 61; 63
		Landing without clearance	158				
		Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	160				
		Pilot tiredness - Inadequate workload distribution	167				
		Flaws in pilot requirements definition process and/or training methodology	168				
		Lack of adherence to Rules of the Air - adherence to Controller clearance	296				
6	TO02B11213	Emergency landing	8		19; 20; 22; 23;	32; 34; 44	47; 50; 51; 54; 55; 57; 59; 60; 61; 62;
		Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	127				
		Traffic controller tiredness - Inadequate workload distribution	137				
		Flaws in traffic controller requirements definition process and/or training methodology	145				
		Landing without clearance	158				
		Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	160				
		Pilot tiredness - Inadequate workload distribution	167			1	
		Flaws in pilot requirements definition process and/or training methodology	168				
_		Lack of adherence to Rules of the Air - adherence to Controller clearance	296				
		Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications	140		11; 19; 22;	32; 34; 43; 44	45; 50; 51; 54; 55; 57; 59; 60; 61; 62;
7	TO02B11214			1	1	1	1
7	TO02B11214	Lack of adherence to SOP for GND movements. Lack of awareness in terms of current	144				
7	T002B11214		144		+		
7	TO02B11214	Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity					
7	TO02B11214	Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Takeoff without clearance Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	157 167 168				
		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Takeoff without clearance Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to Rules of the Air - adherence to Controller clearance	157 167 168 296		11.40.22.52		45,47,50
	TO02B11214	Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Takeoff without clearance Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	157 167 168		11; 19; 22; 23;	32; 34; 43; 44	
		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Takeoff without clearance Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to Rules of the Air - adherence to Controller clearance Lack of adherence to SOP for GND movements. Lack of awareness of other traffic	157 167 168 296		11; 19; 22; 23;	32; 34; 43; 44	45; 47; 50; 51; 54; 56; 57; 59; 60; 61; (63)



Code		Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
T		Flaws in pilot requirements definition process and/or training methodology	168				
		Lack of adherence to Rules of the Air - adherence to Controller clearance	296				
TO02B1	11216	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151		19; 22;	32; 34; 43; 44	45; 47; 50; 51; 59;
		or / and passive contribution to the PF duties					61; 62; 63
		Pilot tiredness - Inadequate workload distribution	167				
		Flaws in pilot requirements definition process and/or training methodology	168				
. ======		Lack of adherence to Rules of the Air - adherence to Controller clearance	296				
TO02B1	1122	Flaws in Airspace and Air Traffic planning procedures design process	323		19; 20; 22;	32; 33; 35;	47; 50; 51; 54; 55 57; 59; 60; 61; 62
		Flaws in airport capacity management process	400				
1 TO02B1	1123	Pilot tiredness - Inadequate workload distribution	167		11; 19; 23;	32; 34; 43; 44	45; 50; 51; 56; 57 60; 61; 62; 63
		Flaws in pilot requirements definition process and/or training methodology	168				00, 01, 02, 03
		Flaws in CRM training procedures	263				
		Lack of adherence to the main CRM rules	264				
		The state of the s	404				
2 TO02B1	1124	preparation. Wildlife incursion	5		11; 22;	43; 44	45; 49; 50; 51; 59
							61; 62; 63
		Bird strike	34				
		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction	162				
		procedure Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence	401				
		integrity monitoring	401				
3 TO02B1	1125	Convective weather / turbulence / windshear or crosswind conditions during take-off	32		22;		48; 50; 51; 56; 57
1 TOOSE	12	Risk of days are a second day (1994)	0.5		22.		60; 61; 62; 63
1 TO02B1	12	Risk of dangerous occurences appeared during take-off roll Flight Crew rejects take-off	85		22;		50; 59;
TO02B2	211	Pilot tiredness - Inadequate workload distribution	167		11; 14; 19; 20; 22; 23;	32; 33; 34; 35; 42; 43;	45; 47; 48; 49; 50
					, _ ,, _ ,, _ ,, _ ,, _ ,,	44	54; 55; 56; 57; 59 61; 62; 63
		Flaws in pilot requirements definition process and/or training methodology	168				
		Late rejected takeoff decision / initiation	368				
-		Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations	384				
-		Wildlife incursion Emergency landing	8				
		Convective weather / turbulence / windshear or crosswind conditions during take-off	32				
		<u> </u>					
		Bird strike	34				
		Risk of dangerous occurences appeared during take-off roll	85				
		Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	127				
+		Lack of English proficiency	132				
1		Incorrect or confusing / misleading ATC instructions	133				
		Use of non-standard phraseology by pilot and/or controller	134				
		Traffic controller tiredness - Inadequate workload distribution	137				
		Inefficient / confusing TWR traffic control procedures, inefficient management of hot	139				
		spots					
		Lack of adherence to SOP for GND movements. Lack of awareness of other traffic	140				
		movements through listening of ATC communications Lack of adherence to SOP for GND movements. Lack of awareness of own position on	142				
		the airsite and airport topology.					
		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient	143				
		separation / clearence					
		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity	144				
		Flaws in traffic controller requirements definition process and/or training methodology	145				
1		Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	146 148				
		driver	140				
		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
_		or / and passive contribution to the PF duties	455		1		ļ
1		Takeoff without clearance	157	-	+	+	-
+		Landing without clearance Lack of adherence to Rules of the Air - runway used for alternating take-offs and	158 160	-	+		-
1		lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	100				
1		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction	162				
1		procedure	167		+		
+		Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168				
+		Flaws in CRM training procedures	263		+		
1		Lack of adherence to the main CRM rules	264		1		
		Lack of adherence to Rules of the Air - adherence to Controller clearance	296				
		Flaws in Airspace and Air Traffic planning procedures design process	323				
		Flaws in airport capacity management process	400				
		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence	401				
-		integrity monitoring	404		+		
1		Lack of adherence to SOP for take-off procedure in terms of time limitation for take-off preparation.	404				
		Taxiing without clearance	367				
TO02B2	212	Pilot tiredness - Inadequate workload distribution	167		11; 14; 19; 20; 22; 23;	32; 33; 34; 35; 42; 43;	45; 47; 48; 49; 50
1				1		44	54; 55; 56; 57; 59
							61; 62; 63



SPIs: System of Code Identifiable precursors No. SPIs: Technology SPIs: Human SPIs: Organisation Organisations Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision 207 Late rejected takeoff decision / initiation 368 Wildlife incursion Emergency landing Convective weather / turbulence / windshear or crosswind conditions during take-off 32 Bird strike 34 Risk of dangerous occurences appeared during take-off roll Lack of adherence to SOP for GND movements in terms of clearance providing by the 127 controller. Lack of English proficiency 132 Incorrect or confusing / misleading ATC instructions 133 Use of non-standard phraseology by pilot and/or controller 134 137 Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot 139 spots Lack of adherence to SOP for GND movements. Lack of awareness of other traffic 140 novements through listening of ATC communications 142 Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient 143 separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current 144 situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology 145 Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle 148 driver Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties Takeoff without clearance Landing without clearance Lack of adherence to Rules of the Air - runway used for alternating take-offs and 160 landings Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction 162 procedure Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology 168 Flaws in CRM training procedures 263 Lack of adherence to the main CRM rules 264 Lack of adherence to Rules of the Air - adherence to Controller clearance 296 Flaws in Airspace and Air Traffic planning procedures design process 323 Flaws in airport capacity management process 400 Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence 401 integrity monitoring Lack of adherence to SOP for take-off procedure in terms of time limitation for take-of 404 preparation. Taxiing without clearance 367 17 TO02B22 not identifiable at that level 11; 14; 19; 20; 22; 23; 32; 33; 34; 35; 42; 43; 45: 47: 48: 49: 50: 51: 54: 55: 56: 57: 59: 60: 61; 62; 63 Wildlife incursion Emergency landing Convective weather / turbulence / windshear or crosswind conditions during take-off Bird strike 34 Risk of dangerous occurences appeared during take-off roll Lack of adherence to SOP for GND movements in terms of clearance providing by the 127 controller. Lack of English proficiency 132 Incorrect or confusing / misleading ATC instructions 133 Use of non-standard phraseology by pilot and/or controller 134 Traffic controller tiredness - Inadequate workload distribution 137 nefficient / confusing TWR traffic control procedures, inefficient management of hot 139 spots Lack of adherence to SOP for GND movements. Lack of awareness of other traffic 140 movements through listening of ATC communications 142 Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient 143 separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current 144 situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology 145 Lack of or poor communication quality Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle 148 driver Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties Takeoff without clearance 158 Landing without clearance



SPIs: System of Code Identifiable precursors No. SPIs: Technology SPIs: Human **SPIs: Organisation** Organisations Lack of adherence to Rules of the Air - runway used for alternating take-offs and 160 landings Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction 162 procedure Pilot tiredness - Inadequate workload distribution 167 168 Flaws in pilot requirements definition process and/or training methodology 263 Flaws in CRM training procedures Lack of adherence to the main CRM rules 264 Lack of adherence to Rules of the Air - adherence to Controller clearance 296 Flaws in Airspace and Air Traffic planning procedures design process 323 400 Flaws in airport capacity management process Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence 401 integrity monitoring Lack of adherence to SOP for take-off procedure in terms of time limitation for take-off 404 preparation. 367 Taxiing without clearance Failure to achieve maximum braking 18 TO02B31 Convective weather - heavy rain resulted with wet RWY surface 75 11; 14; 19; 20; 22; 23; 32; 33; 34; 35; 42; 43; 45; 47; 48; 49; 50; 51; 54; 55; 56; 57; 59; 60; 61; 62; 63 167 Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology 168 Gross error in takeoff weight entry and/or in V1 / VR speeds assessment nadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY 203 surface condition. Snow / ice presence / or runway surface friction rate below minimum High energy RTO rate is an indicator of improper Operator's policy for T/O operations. 211 Poor application of T/O & RTO procedure, computation of T/O parameters 260 Wildlife incursion Emergency landing Convective weather / turbulence / windshear or crosswind conditions during take-off 32 Risk of dangerous occurences appeared during take-off roll Lack of adherence to SOP for GND movements in terms of clearance providing by the 127 controller. Lack of English proficiency 132 Incorrect or confusing / misleading ATC instructions 133 Use of non-standard phraseology by pilot and/or controller 134 Traffic controller tiredness - Inadequate workload distribution 137 Inefficient / confusing TWR traffic control procedures, inefficient management of hot 139 spots Lack of adherence to SOP for GND movements. Lack of awareness of other traffic 140 movements through listening of ATC communications Lack of adherence to SOP for GND movements. Lack of awareness of own position on 142 the airsite and airport topology. Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient 143 separation / clearence Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity Flaws in traffic controller requirements definition process and/or training methodology 145 Lack of or poor communication quality 146 Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties Takeoff without clearance 157 Landing without clearance 158 Lack of adherence to Rules of the Air - runway used for alternating take-offs and 160 landings Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction 162 procedure Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Flaws in CRM training procedures 263 Lack of adherence to the main CRM rules 264 Lack of adherence to Rules of the Air - adherence to Controller clearance 296 Flaws in Airspace and Air Traffic planning procedures design process 323 400 Flaws in airport capacity management process Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence ntegrity monitoring Lack of adherence to SOP for take-off procedure in terms of time limitation for take-off 404 preparation. Taxiing without clearance 367 Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology 168 Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision 207 Late rejected takeoff decision / initiation 368 Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations 384 19 TO02B32 System failure affecting aircraft configuration, controllability and/or flying qualities 11; 14; 19; 20; 22; 23; 32; 33; 34; 35; 42; 43; 45; 47; 48; 49; 50; 51; 44 54; 55; 56; 57; 59; 60; 61: 62: 63



Codo	Idoutifiahla nyasyyssays	No	SPIs: Technology	CDIs. Human	CDIs: Organisation	SPIs: System of
Code	Identifiable precursors Contaminated Runway	39	SPIS: Technology	SPIs: Human	SPIs: Organisation	Organisations
	Flaws in maintenance technician / airworthiness specialist requirements definition	149				
	process and/or training methodology	149				
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
	distribution	130				
	Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of	1216				
	contaminations.	210				
		366				
	Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing	300				
	control related system and components (incl. brake).	 				
	Wildlife incursion	5				
	Emergency landing	8				
	Convective weather / turbulence / windshear or crosswind conditions during take-off	32				
		₩				
	Bird strike	34				
	Risk of dangerous occurences appeared during take-off roll	85				
	Lack of adherence to SOP for GND movements in terms of clearance providing by the	127				
	controller.	ــــــ				
	Lack of English proficiency	132				
	Incorrect or confusing / misleading ATC instructions	133				
	Use of non-standard phraseology by pilot and/or controller	134				
	Traffic controller tiredness - Inadequate workload distribution	137				
	Inefficient / confusing TWR traffic control procedures, inefficient management of hot	139				
	spots					
	Lack of adherence to SOP for GND movements. Lack of awareness of other traffic	140				
	movements through listening of ATC communications	L		<u> </u>	<u> </u>	
	Lack of adherence to SOP for GND movements. Lack of awareness of own position on	142				
	the airsite and airport topology.					
	Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient	143				
	separation / clearence					
	Lack of adherence to SOP for GND movements. Lack of awareness in terms of current	144				
	situation on the airsite or / and aircraft / vehicle proximity	Ι΄.				
	Flaws in traffic controller requirements definition process and/or training methodology	145	1		1	
		5				
	Lack of or poor communication quality	146				
	Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	148				
	driver	140				
		151				
	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
	or / and passive contribution to the PF duties	-				
	Takeoff without clearance	157				
	Landing without clearance	158				
	Lack of adherence to Rules of the Air - runway used for alternating take-offs and	160				
	landings					
	Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction	162				
	procedure					
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168				
	Flaws in CRM training procedures	263				
	Lack of adherence to the main CRM rules	264				
	Lack of adherence to Rules of the Air - adherence to Controller clearance	296				
	Flaws in Airspace and Air Traffic planning procedures design process	323				
	Flaws in airport capacity management process	400				
	Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence	401				
	integrity monitoring	1.01				
+	Lack of adherence to SOP for take-off procedure in terms of time limitation for take-off	404	+		 	
	preparation.	704				
	Taxiing without clearance	207	 		 	
+	Pilot tiredness - Inadequate workload distribution	367	 		 	
+		167	+	+	+	
+	Flaws in pilot requirements definition process and/or training methodology	168			 	
1	Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207				
		-	+		-	
1	Late rejected takeoff decision / initiation	368	 		1	
	Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations	384				
20 TO02B33	Pilot tiredness - Inadequate workload distribution	167		11; 14; 19; 20; 22; 23;	28; 29; 30; 32; 33; 34;	45; 47; 48; 49; 50;
					35; 42; 43; 44	54; 55; 56; 57; 59;
		L				61; 62; 63
	Flaws in pilot requirements definition process and/or training methodology	168				
	Poor application of T/O & RTO procedure, braking initiation sequence	199				
	Wildlife incursion	5				
	Emergency landing	8				
	Convective weather / turbulence / windshear or crosswind conditions during take-off	32				
	Bird strike	34				
	Risk of dangerous occurences appeared during take-off roll	85	1			
+	Lack of adherence to SOP for GND movements in terms of clearance providing by the	127	+		 	
		12/				
	controller.	122	 		 	
		132	 	<u> </u>	 	
	Lack of English proficiency	133			-	
	Incorrect or confusing / misleading ATC instructions	-				I .
	Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller	134				
	Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution	134 137				
	Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller	134				
	Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution	134 137				
	Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot	134 137				
	Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	134 137 139				
	Incorrect or confusing / misleading ATC instructions Use of non-standard phraseology by pilot and/or controller Traffic controller tiredness - Inadequate workload distribution Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots Lack of adherence to SOP for GND movements. Lack of awareness of other traffic	134 137 139				



	Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient	143				
		separation / clearence					
		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity	144				
		Flaws in traffic controller requirements definition process and/or training methodology	145				
		Lack of or poor communication quality	146				
		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle	148				
-		driver Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
		or / and passive contribution to the PF duties	131				
		Takeoff without clearance	157				
		Landing without clearance	158				
		Lack of adherence to Rules of the Air - runway used for alternating take-offs and	160				
		landings Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction	162				
		procedure	102				
		Pilot tiredness - Inadequate workload distribution	167				
		Flaws in pilot requirements definition process and/or training methodology	168				
		Flaws in CRM training procedures	263				
		Lack of adherence to the main CRM rules	264				
-		Lack of adherence to Rules of the Air - adherence to Controller clearance Flaws in Airspace and Air Traffic planning procedures design process	296 323				
		Flaws in airport capacity management process	400				
		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence	401				
		integrity monitoring					
		Lack of adherence to SOP for take-off procedure in terms of time limitation for take-off	404				
_		preparation.	367		+		
\dashv		Taxiing without clearance Pilot tiredness - Inadequate workload distribution	167		+		
		Flaws in pilot requirements definition process and/or training methodology	168		1		
		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207				
		Late rejected takeoff decision / initiation	368				
SD 3	Code	Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations identifiable precursors	384 No.	Technology	Human	Organisation	System of
30 3	Couc	identifiable precursors	140.	recimology	numum	Organisation	Organisations
- 1		Inappropriate handling by flight crew					Ü
1	TO03B111	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151	9;	22;		50; 51; 54; 55; 58; 59
_		or / and passive contribution to the PF duties					60; 61; 62; 63
-		Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168				
2	TO03B112	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151		22;		50; 51; 54; 55; 58; 59
-		or / and passive contribution to the PF duties					60; 61; 62; 63
		Pilot tiredness - Inadequate workload distribution	167				
_		Flaws in pilot requirements definition process and/or training methodology	168 202				
		Lack of adherence to AFM limitations for Take-off					
		Egilure to remember / assess crosswind component limit for prevailing runway	_				
		Failure to remember / assess crosswind component limit for prevailing runway condition	418				
3	TO03B12	Failure to remember / assess crosswind component limit for prevailing runway condition Convective weather / turbulence / windshear or crosswind conditions during take-off	_		22;		48; 50; 51; 52; 53; 54
3	TO03B12	condition	418		22;		48; 50; 51; 52; 53; 54 55; 58; 59; 60; 61; 62
3	TO03B12	condition Convective weather / turbulence / windshear or crosswind conditions during take-off	418 32		22;		
3	TO03B12	condition Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased	418		22;		55; 58; 59; 60; 61; 62
3	TO03B12	condition Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate	418 32 45		22;		55; 58; 59; 60; 61; 62
3	TO03B12	condition Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased	418 32		22;		55; 58; 59; 60; 61; 62
3	TO03B12	condition Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft	418 32 45 200		22;		55; 58; 59; 60; 61; 62
3	ТООЗВ12	condition Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below	418 32 45 200		22;		55; 58; 59; 60; 61; 62
	T003B12	condition Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum	418 32 45 200		22;		55; 58; 59; 60; 61; 62
II		condition Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum Take-off Rejection	418 32 45 200 203	9:			55; 58; 59; 60; 61; 62 63
II	T003B12	condition Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum	418 32 45 200	9;	22;		55; 58; 59; 60; 61; 62 63 48; 50; 51; 52; 53; 54
II		condition Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum Take-off Rejection Pilot tiredness - Inadequate workload distribution	418 32 45 200 203	9;			55; 58; 59; 60; 61; 62 63 48; 50; 51; 52; 53; 54
II		condition Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum Take-off Rejection Pilot tiredness - Inadequate workload distribution	418 32 45 200 203 167	9;			55; 58; 59; 60; 61; 62 63 48; 50; 51; 52; 53; 54 55; 58; 59; 60; 61; 62
II		condition Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum Take-off Rejection Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Late rejected takeoff decision / initiation	418 32 45 200 203 167 168 368	9;			55; 58; 59; 60; 61; 62 63 48; 50; 51; 52; 53; 54 55; 58; 59; 60; 61; 62
II		condition Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum Take-off Rejection Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Late rejected takeoff decision / initiation Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations	418 32 45 200 203 167 168 368 384	9;			55; 58; 59; 60; 61; 62 63 48; 50; 51; 52; 53; 54 55; 58; 59; 60; 61; 62
II		condition Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum Take-off Rejection Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Late rejected takeoff decision / initiation	418 32 45 200 203 167 168 368	9;			55; 58; 59; 60; 61; 62 63 48; 50; 51; 52; 53; 54 55; 58; 59; 60; 61; 62
II		condition Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum Take-off Rejection Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Late rejected takeoff decision / initiation Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased	418 32 45 200 203 167 168 368 384	9;			55; 58; 59; 60; 61; 62 63 48; 50; 51; 52; 53; 54 55; 58; 59; 60; 61; 62
II		condition Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum Take-off Rejection Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Late rejected takeoff decision / initiation Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate	418 32 45 200 203 167 168 368 384 32	9;			55; 58; 59; 60; 61; 62 63 48; 50; 51; 52; 53; 54 55; 58; 59; 60; 61; 62
II		condition Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum Take-off Rejection Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Late rejected takeoff decision / initiation Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	418 32 45 200 203 167 168 368 384 32	9;			55; 58; 59; 60; 61; 62 63 48; 50; 51; 52; 53; 54 55; 58; 59; 60; 61; 62
II		condition Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum Take-off Rejection Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Late rejected takeoff decision / initiation Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	418 32 45 200 203 167 168 368 384 32 45	9;			55; 58; 59; 60; 61; 62 63 48; 50; 51; 52; 53; 54 55; 58; 59; 60; 61; 62
II		condition Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum Take-off Rejection Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Late rejected takeoff decision / initiation Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	418 32 45 200 203 167 168 368 384 32	9;			55; 58; 59; 60; 61; 62 63 48; 50; 51; 52; 53; 54 55; 58; 59; 60; 61; 62
II		condition Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum Take-off Rejection Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Late rejected takeoff decision / initiation Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution	418 32 45 200 203 167 168 368 384 32 45 151	9;			55; 58; 59; 60; 61; 62 63 48; 50; 51; 52; 53; 54 55; 58; 59; 60; 61; 62
II		condition Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum Take-off Rejection Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Late rejected takeoff decision / initiation Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling	418 32 45 200 203 167 168 388 384 32 45 151 167 168 200	9;			55; 58; 59; 60; 61; 62 63 48; 50; 51; 52; 53; 54 55; 58; 59; 60; 61; 62
II		condition Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum Take-off Rejection Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Late rejected takeoff decision / initiation Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling Lack of adherence to AFM limitations for Take-off	418 32 45 200 203 167 168 368 384 32 45 151 167 168 200 202	9;			55; 58; 59; 60; 61; 62 63 48; 50; 51; 52; 53; 54 55; 58; 59; 60; 61; 62
II		condition Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum Take-off Rejection Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Late rejected takeoff decision / initiation Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling Lack of adherence to AFM limitations for Take-off Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY	418 32 45 200 203 167 168 368 384 32 45 151 167 168 200 202	9;			55; 58; 59; 60; 61; 62 63 48; 50; 51; 52; 53; 54 55; 58; 59; 60; 61; 62
II		condition Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum Take-off Rejection Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Late rejected takeoff decision / initiation Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling Lack of adherence to AFM limitations for Take-off Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below	418 32 45 200 203 167 168 368 384 32 45 151 167 168 200 202	9;			55; 58; 59; 60; 61; 62 63 48; 50; 51; 52; 53; 54 55; 58; 59; 60; 61; 62
II		condition Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum Take-off Rejection Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Late rejected takeoff decision / initiation Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling Lack of adherence to AFM limitations for Take-off Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY	418 32 45 200 203 167 168 368 384 32 45 151 167 168 200 202	9;			55; 58; 59; 60; 61; 62 63 48; 50; 51; 52; 53; 54 55; 58; 59; 60; 61; 62
11 4	T003B211	condition Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum Take-off Rejection Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Late rejected takeoff decision / initiation Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling Lack of adherence to AFM limitations for Take-off Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum Failure to remember / assess crosswind component limit for prevailing runway condition	418 32 45 200 203 167 168 384 32 45 151 167 168 200 202 203 418		22;		55; 58; 59; 60; 61; 62 63 48; 50; 51; 52; 53; 54 55; 58; 59; 60; 61; 62
11 4		condition Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum Take-off Rejection Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Late rejected takeoff decision / initiation Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling Lack of adherence to AFM limitations for Take-off Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum Failure to remember / assess crosswind component limit for prevailing runway	418 32 45 200 203 167 168 368 384 32 45 151 167 202 203				55; 58; 59; 60; 61; 62 63 48; 50; 51; 52; 53; 54 55; 58; 59; 60; 61; 62



Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	Organisations
	Flaws in pilot requirements definition process and/or training methodology	168		O. IST. Haman	- Isr Grigamsation	- Gameations
	Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207			 	
		1				
	Late rejected takeoff decision / initiation	368				
	Convective weather / turbulence / windshear or crosswind conditions during take-off	32				
	Adverse weather in terms of heavy rain or icing conditions resulted with decreased	45				
	RWY surface friction rate					
	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
	or / and passive contribution to the PF duties					
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168				
	Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft	200				
	handling					
	Lack of adherence to AFM limitations for Take-off	202				
	Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY	203				
	surface condition. Snow / ice presence / or runway surface friction rate below					
	minimum					
	Failure to remember / assess crosswind component limit for prevailing runway	418				
	condition	-				
6 TO03B22	not identifiable at that level		9;	22;		48; 50; 51; 52; 53; 54;
						55; 58; 59; 60; 61; 62;
						63
	Convective weather / turbulence / windshear or crosswind conditions during take-off	32				
	Advanced by the state of the st	45	 		+	
	Adverse weather in terms of heavy rain or icing conditions resulted with decreased	45				
	RWY surface friction rate	4	-		+	
	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
	or / and passive contribution to the PF duties					
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168				
	Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft	200				
	handling					
	Lack of adherence to AFM limitations for Take-off	202				
	Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY	203				
	surface condition. Snow / ice presence / or runway surface friction rate below					
	minimum					
	Failure to remember / assess crosswind component limit for prevailing runway	418				
	condition					
Ш	Failure to maintain control (V <= V1)					
7 TO03B31	not identifiable at that level		9;	22;		48; 50; 51; 52; 53; 54;
						55; 58; 59; 60; 61; 62;
						63
	Convective weather / turbulence / windshear or crosswind conditions during take-off	32				
	Adverse weather in terms of heavy rain or icing conditions resulted with decreased	45				
	RWY surface friction rate					
	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
	or / and passive contribution to the PF duties					
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168				
	Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft	200				
	handling					
	Lack of adherence to AFM limitations for Take-off	202				
	Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY	203				
	surface condition. Snow / ice presence / or runway surface friction rate below	203				
	surface condition. Snow / ice presence / or runway surface friction rate below minimum					
	surface condition. Snow / ice presence / or runway surface friction rate below minimum Failure to remember / assess crosswind component limit for prevailing runway	203 418				
	surface condition. Snow / ice presence / or runway surface friction rate below minimum Failure to remember / assess crosswind component limit for prevailing runway condition	418				
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	surface condition. Snow / ice presence / or runway surface friction rate below minimum Failure to remember / assess crosswind component limit for prevailing runway condition Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	418 167 168 207				
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8 TO03B32	surface condition. Snow / ice presence / or runway surface friction rate below minimum Failure to remember / assess crosswind component limit for prevailing runway condition Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Late rejected takeoff decision / initiation Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations	418 167 168 207 368 384		22;		
8 TO03B32	surface condition. Snow / ice presence / or runway surface friction rate below minimum Failure to remember / assess crosswind component limit for prevailing runway condition Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Late rejected takeoff decision / initiation Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations	418 167 168 207 368 384		22;		55; 58; 59; 60; 61; 62;
8 TO03B32	surface condition. Snow / ice presence / or runway surface friction rate below minimum Failure to remember / assess crosswind component limit for prevailing runway condition Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Late rejected takeoff decision / initiation Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations Pilot tiredness - Inadequate workload distribution	418 167 168 207 368 384 167		22;		55; 58; 59; 60; 61; 62;
8 TO03B32	surface condition. Snow / ice presence / or runway surface friction rate below minimum Failure to remember / assess crosswind component limit for prevailing runway condition Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Late rejected takeoff decision / initiation Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	418 167 168 207 368 384 167		22;		48; 50; 51; 52; 53; 54; 55; 58; 59; 60; 61; 62; 63
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8 TOO3B32	surface condition. Snow / ice presence / or runway surface friction rate below minimum Failure to remember / assess crosswind component limit for prevailing runway condition Pilot triedness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Late rejected takeoff decision / initiation Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling	167 168 207 368 384 167 168 388		22;		55; 58; 59; 60; 61; 62;
8 TO03B32	surface condition. Snow / ice presence / or runway surface friction rate below minimum Failure to remember / assess crosswind component limit for prevailing runway condition Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Late rejected takeoff decision / initiation Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling Convective weather / turbulence / windshear or crosswind conditions during take-off	167 168 207 368 384 167 168 388 32		22;		55; 58; 59; 60; 61; 62;
8 TO03B32	surface condition. Snow / ice presence / or runway surface friction rate below minimum Failure to remember / assess crosswind component limit for prevailing runway condition Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Late rejected takeoff decision / initiation Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased	167 168 207 368 384 167 168 388 32		22;		55; 58; 59; 60; 61; 62;
8 TO03B32	surface condition. Snow / ice presence / or runway surface friction rate below minimum Failure to remember / assess crosswind component limit for prevailing runway condition Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Late rejected takeoff decision / initiation Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	167 168 207 368 384 167 168 388 32		22;		55; 58; 59; 60; 61; 62;
8 TO03B32	surface condition. Snow / ice presence / or runway surface friction rate below minimum Failure to remember / assess crosswind component limit for prevailing runway condition Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Late rejected takeoff decision / initiation Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	418 167 168 207 368 384 167 168 388 32 45 151		22;		55; 58; 59; 60; 61; 62;
8 TO03B32	surface condition. Snow / ice presence / or runway surface friction rate below minimum Failure to remember / assess crosswind component limit for prevailing runway condition Pilot triedness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Late rejected takeoff decision / initiation Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution	418 167 168 207 368 384 167 168 388 32 45		22;		55; 58; 59; 60; 61; 62;
8 TO03B32	surface condition. Snow / ice presence / or runway surface friction rate below minimum Failure to remember / assess crosswind component limit for prevailing runway condition Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Late rejected takeoff decision / initiation Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Flott tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	418 167 168 207 368 384 167 168 32 45 151		22;		55; 58; 59; 60; 61; 62;
8 TO03B32	surface condition. Snow / ice presence / or runway surface friction rate below minimum Failure to remember / assess crosswind component limit for prevailing runway condition Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Late rejected takeoff decision / initiation Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft	418 167 168 207 368 384 167 168 388 32 45		22;		55; 58; 59; 60; 61; 62;
8 TOO3B32	surface condition. Snow / ice presence / or runway surface friction rate below minimum Failure to remember / assess crosswind component limit for prevailing runway condition Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Late rejected takeoff decision / initiation Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling	418 167 168 207 368 384 167 168 388 32 45 151 167 168 200		22;		55; 58; 59; 60; 61; 62;
8 TO03B32	surface condition. Snow / ice presence / or runway surface friction rate below minimum Failure to remember / assess crosswind component limit for prevailing runway condition Pilot triedness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Late rejected takeoff decision / initiation Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling Lack of adherence to AFM limitations for Take-off	418 167 168 207 368 384 167 168 388 32 45 151 167 168 200		22;		55; 58; 59; 60; 61; 62;
8 TO03B32	surface condition. Snow / ice presence / or runway surface friction rate below minimum Failure to remember / assess crosswind component limit for prevailing runway condition Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Late rejected takeoff decision / initiation Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling	418 167 168 207 368 384 167 168 388 32 45 151 167 168 200		22;		55; 58; 59; 60; 61; 62;



Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	Failure to remember / assess crosswind component limit for prevailing runway	418				
	condition Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168				
	Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207				
	, , , , , , , , , , , , , , , , , , ,					
	Late rejected takeoff decision / initiation	368				
	Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations	384				
9 TO03B33	Pilot tiredness - Inadequate workload distribution	167	9;	22;		48; 50; 51; 52; 53;
						55; 58; 59; 60; 61;
	Florida de la compansa de Carlos de	4.00				63
	Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling	168 388				+
	Convective weather / turbulence / windshear or crosswind conditions during take-off	32				
	Adverse weather in terms of heavy rain or icing conditions resulted with decreased	45				
	RWY surface friction rate					
	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
	or / and passive contribution to the PF duties					
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft	168 200				
	handling	200				
	Lack of adherence to AFM limitations for Take-off	202		+		
	Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY					
1	surface condition. Snow / ice presence / or runway surface friction rate below					
	minimum	L				
	Failure to remember / assess crosswind component limit for prevailing runway	418				
1	condition					
+	Pilot tiredness - Inadequate workload distribution	167		+		+
+	Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	168 207		+		
	application of 170 & KTO procedure, autherence to SOP, Criteria for STOP decision	20/				
	Late rejected takeoff decision / initiation	368				
	Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations	384				
0 TO03B34	Pilot tiredness - Inadequate workload distribution	167	9;	22;		48; 50; 51; 52; 53
						55; 58; 59; 60; 61 63
	Flaws in pilot requirements definition process and/or training methodology	168				
	Poor application of T/O & RTO procedure, aircraft handling	388				
	Convective weather / turbulence / windshear or crosswind conditions during take-off	32				
	Advanced by the state of the st	45				
	Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate	45				
	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
	or / and passive contribution to the PF duties	-				
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168				
	Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft	200				
	handling					
	Lack of adherence to AFM limitations for Take-off	202				
	Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY	203				
	surface condition. Snow / ice presence / or runway surface friction rate below minimum					
	Failure to remember / assess crosswind component limit for prevailing runway	418				
	condition					
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168				
1	Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207				
+	has actual and a first and a f	200		+		+
1	Late rejected takeoff decision / initiation	368		+		
V	Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations Failure to Achieve Maximum Braking	384		+		+
1 TO03B41	Convective weather - heavy rain resulted with wet RWY surface	75	9;	22;		48; 50; 51; 52; 53 55; 58; 59; 60; 61 63
1	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168				
	Gross error in takeoff weight entry and/or in V1 / VR speeds assessment	179				
1	Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY	203				
	surface condition. Snow / ice presence / or runway surface friction rate below					
	minimum High energy PTO rate is an indicator of improper Operator's policy for T/O operations	211		+		
1	High energy RTO rate is an indicator of improper Operator's policy for T/O operations.	211				
+	Poor application of T/O & RTO procedure, computation of T/O parameters	260		+		
	Convective weather / turbulence / windshear or crosswind conditions during take-off	32		1		
		45				
	Adverse weather in terms of heavy rain or icing conditions resulted with decreased	43				1
	RWY surface friction rate					
	RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
	RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151				
	RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution	151 167				
	RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151				



Lack of adherence to AFM limitations for Take-off laadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum Failure to remember / assess crosswind component limit for prevailing runway condition Pilot tiredness - Inadequate workload distribution Plot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Late rejected takeoff decision / initiation Assess Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Flaws in pilot requirements definition process and/or training methodology 168	SPIs: Organisation	Organisations
Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum Failure to remember / assess crosswind component limit for prevailing runway condition Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Late rejected takeoff decision / initiation Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology 168		
surface condition. Snow / ice presence / or runway surface friction rate below minimum Failure to remember / assess crosswind component limit for prevailing runway condition Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision 207 Late rejected takeoff decision / initiation 368 Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations 384 Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168		
minimum Failure to remember / assess crosswind component limit for prevailing runway condition Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology 168 Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision 207 Late rejected takeoff decision / initiation 368 Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations 384 Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168		
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Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Late rejected takeoff decision / initiation Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology 168		
Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Late rejected takeoff decision / initiation Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology 168		
Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision 207 Late rejected takeoff decision / initiation 368 Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations 384 Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168		
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Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations 384 Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168		
Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations 384 Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168		
Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168		
Flaws in pilot requirements definition process and/or training methodology 168		
Poor application of T/O & RTO procedure, aircraft handling 388		
12 TO03B42 System failure affecting aircraft configuration, controllability and/or flying qualities 25 7; 9; 22;		48; 50; 51; 52; 53; 54; 55; 58; 59; 60; 61; 62;
		63
Contaminated Runway 39		03
process and/or training methodology		
Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150		
distribution		
Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of 216 contaminations.		
Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing 366		
control related system and components (incl. brake).		
Convective weather / turbulence / windshear or crosswind conditions during take-off 32		
Adverse weather in terms of heavy rain or icing conditions resulted with decreased 45		
RWY surface friction rate		
Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151		
or / and passive contribution to the PF duties		
Pilot tiredness - Inadequate workload distribution 167		
Flaws in pilot requirements definition process and/or training methodology 168		
Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft 200		
handling		
Lack of adherence to AFM limitations for Take-off 202		
Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY 203		
surface condition. Snow / ice presence / or runway surface friction rate below		
minimum		
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condition		
Pilot tiredness - Inadequate workload distribution 167		
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Late rejected takeoff decision / initiation Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling 388		55; 58; 59; 60; 61; 62;
Late rejected takeoff decision / initiation 368 Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations 384 Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Poor application of T/O & RTO procedure, aircraft handling 388 13 TO03B43 Pilot tiredness - Inadequate workload distribution 167 9; 22; 28		
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Late rejected takeoff decision / initiation 368 Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations 384 Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Poor application of T/O & RTO procedure, aircraft handling 388 13 TO03B43 Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 169; 22; 28 Flaws in pilot requirements definition process and/or training methodology 168 Poor application of T/O & RTO procedure, braking initiation sequence 199 Convective weather / turbulence / windshear or crosswind conditions during take-off 32 Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate		55; 58; 59; 60; 61; 62;
Late rejected takeoff decision / initiation 368 Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations 384 Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Poor application of T/O & RTO procedure, aircraft handling 388 13 TO03B43 Pilot tiredness - Inadequate workload distribution 167 9; 22; 28 Flaws in pilot requirements definition process and/or training methodology 168 Poor application of T/O & RTO procedure, braking initiation sequence 199 Convective weather / turbulence / windshear or crosswind conditions during take-off 32 Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151		55; 58; 59; 60; 61; 62;
Late rejected takeoff decision / initiation Decision of T/O & RTO procedure, adherence to SOP and AFM limitations 384		55; 58; 59; 60; 61; 62;
Late rejected takeoff decision / initiation Decision of T/O & RTO procedure, adherence to SOP and AFM limitations 384		55; 58; 59; 60; 61; 62;
Late rejected takeoff decision / initiation Decision of T/O & RTO procedure, adherence to SOP and AFM limitations 388		55; 58; 59; 60; 61; 62;
Late rejected takeoff decision / initiation 368 Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations 384 Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Poor application of T/O & RTO procedure, aircraft handling 388 13 TO03B43 Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Poor application of T/O & RTO procedure, braking initiation sequence 199 Convective weather / turbulence / windshear or crosswind conditions during take-off 32 Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft 200		55; 58; 59; 60; 61; 62;
Late rejected takeoff decision / initiation Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling 388 Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology Flaws in pilot requirements definition process and/or training methodology Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, braking initiation sequence Poor application of T/O & RTO procedure, braking initiation sequence Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling		55; 58; 59; 60; 61; 62;
Late rejected takeoff decision / initiation Residual Section 100		55; 58; 59; 60; 61; 62;
Late rejected takeoff decision / initiation Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling 388 Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology Flaws in pilot requirements definition process and/or training methodology Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, braking initiation sequence Poor application of T/O & RTO procedure, braking initiation sequence Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling		55; 58; 59; 60; 61; 62;
Late rejected takeoff decision / initiation Residual Section 100		55; 58; 59; 60; 61; 62;
Late rejected takeoff decision / initiation 368 Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations 384 Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Poor application of T/O & RTO procedure, aircraft handling 388 13 TO03B43 Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Poor application of T/O & RTO procedure, braking initiation sequence 199 Convective weather / turbulence / windshear or crosswind conditions during take-off 32 Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft 200 handling 202 Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY 203		55; 58; 59; 60; 61; 62;
Late rejected takeoff decision / initiation Boor application of T/O & RTO procedure, adherence to SOP and AFM limitations 384		55; 58; 59; 60; 61; 62;
Late rejected takeoff decision / initiation Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling 388 13 T003B43 Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Flaws in pilot requirements definition process and/or training methodology Flaws in pilot requirements definition process and/or training methodology Flaws in pilot requirements definition process and/or training methodology Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology ROP or application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling Lack of adherence to AFM limitations for Take-off 202 Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum Fallure to remember / assess crosswind component limit for prevailing runway 418		55; 58; 59; 60; 61; 62;
Late rejected takeoff decision / initiation Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling 13 TO03843 Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, braking initiation sequence Poor application of T/O & RTO procedure, braking initiation sequence Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling Lack of adherence to AFM limitations for Take-off Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum Failure to remember / assess crosswind component limit for prevailing runway condition		55; 58; 59; 60; 61; 62;
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Late rejected takeoff decision / inititation Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations 384		55; 58; 59; 60; 61; 62;
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Late rejected takeoff decision / inititation Debug application of T/O & RTO procedure, adherence to SOP and AFM limitations 384		55; 58; 59; 60; 61; 62;
Late rejected takeoff decision / inititation Debug application of T/O & RTO procedure, adherence to SOP and AFM limitations 384		55; 58; 59; 60; 61; 62;
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Late rejected takeoff decision / initiation Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling Poor application of T/O & RTO procedure, aircraft handling Poor application of T/O & RTO procedure, braking initiation sequence Poor application of T/O & RTO procedure, braking initiation sequence Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface from time the solution. Snow / ice presence / or runway surface friction rate below minimum Failure to remember / assess crosswind component limit for prevailing runway condition. Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum Failure to remember / assess crosswind component limit for prevailing runway condition Pilot tiredness - Inadequate workload distribution Failure to remember / assess crosswind component limit for prevailing methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations		55; 58; 59; 60; 61; 62;
Late rejected takeoff decision / initiation Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Flow in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to AFM limitations for Take-off Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum Failure to remember / assess crosswind component limit for prevailing runway Failure to remember / assess crosswind component limit for prevailing runway Failure to remember / assess crosswind component limit for prevailing methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Pilot tiredness - Inadequate workload distribution Late rejected takeoff decision / initiation Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations Pilot tiredness - Inadequate workload distribution Late rejected takeoff decision / initiation Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations Pilot tiredness - Inadequate workload distribution		55; 58; 59; 60; 61; 62;
Late rejected takeoff decision / initiation Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations 384 Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology 168 Poor application of T/O & RTO procedure, arcraft handling 388 13 TO03B43 Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Poor application of T/O & RTO procedure, braking initiation sequence 199 Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions during take-off RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology 168 Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling Lack of adherence to AFM limitations for Take-off Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow, ice presence / or runway surface friction rate below minimum Failure to remember / assess crosswind component limit for prevailing runway condition Pilot tiredness - Inadequate workload distribution Pilot tiredness - Inadequate workload distribution Pilot tiredness - Inadequate workload distribution Pilot tiredness - Inadequate workload distribution Pilot tiredness - Inadequate workload distribution Pilot tiredness - Inadequate workload distribution Pilot tiredness - Inadequate workload distribution Pilot tiredness - Inadequate workload distribution Pilot tiredness - Inadequate workload distribution Pilot tiredness - Inadequate workload distribution Pilot tiredness - Inadequate workload distribution Pilot tiredness - Inadequate workload distribution Pilot tiredness - Inadequate workload distribution Pilo		55; 58; 59; 60; 61; 62;
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O03B51	not identifiable at the moment		SPIs: Technology 9;	22;	SPIs: Organisation	Organisations 48; 50; 51; 52; 53; 54;
						55; 58; 59; 60; 61; 62; 63
	Convective weather / turbulence / windshear or crosswind conditions during take-off	32				0.5
	-					
	Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate	45				
	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
	or / and passive contribution to the PF duties					
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168				
		200				
	Lack of adherence to AFM limitations for Take-off	202				
	1 '	203				
		418		+		
	condition	110				
O03B52	Pilot tiredness - Inadequate workload distribution	167	9;	22;		48; 50; 51; 52; 53; 54
						55; 58; 59; 60; 61; 62
	Flave in pilot requirements definition process and/or training methodology	160				63
		_		+		
	Convective weather / turbulence / windshear or crosswind conditions during take-off	32		1		
				1		
	Adverse weather in terms of heavy rain or icing conditions resulted with decreased	45		1		
		151		+		
	or / and passive contribution to the PF duties	131				
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168				
		200				
		202				
	Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY	203				
	surface condition. Snow / ice presence / or runway surface friction rate below					
		440				
		418				
O03B53		167	9:	22:		48; 50; 51; 52; 53; 54
			,	'		55; 58; 59; 60; 61; 62
						63
		_		+		
	Adverse weather in terms of heavy rain or icing conditions resulted with decreased	45				
		151				
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168				
	Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft	200				
	5	202				
		_		+		
	surface condition. Snow / ice presence / or runway surface friction rate below					
	minimum					
		418				
:003B54		167	g.	22.		48; 50; 51; 52; 53; 54
33337	. not the care 55 in adequate workload distribution	107	,	,		55; 58; 59; 60; 61; 62
						63
	Flaws in pilot requirements definition process and/or training methodology	168				
				+	+	
	Convective weather / turbulence / windshear or crosswind conditions during take-off	32		1		
	Adverse weather in terms of heavy rain or icing conditions resulted with decreased	45				
	RWY surface friction rate					
		151		1		
	or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution	167		+	+	
	Flaws in pilot requirements definition process and/or training methodology	168		+	+	
	Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft	200				
	handling			1		
	Lack of adherence to AFM limitations for Take-off	202		+		+
			I		1	1
	Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY	203				
		203				
	Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum Failure to remember / assess crosswind component limit for prevailing runway	418				
	Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum Failure to remember / assess crosswind component limit for prevailing runway condition	418				
Code	Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum Failure to remember / assess crosswind component limit for prevailing runway	418	Technology	Human	Organisation	System of Organisations
		Inadequate maintenance of RWV. Lack of adherence to ICAO Annex 14 in terms of RWV surface condition. Snow / ice presence / or runway surface friction rate below minimum Failure to remember / assess crosswind component limit for prevailing runway condition O03852 Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling Lack of adherence to AFM limitations for Take-off Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below minimum Failure to remember / assess crosswind component limit for prevailing runway condition O03853 Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling Convective weather / turbulence / windshear or crosswind conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling Cack of adherence to AFM limitations for	Lack of adherence to AFM limitations for Take-off Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. 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Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. 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Lack of adherence to ICAO Annex 14 in terms of RWY 203 surface condition. Snow / ice presence / or runway surface friction rate below minimum Failure to remember / assess crosswind component limit for prevailing runway condition Condition O03852 Pilot tredness - Inadequate workload distribution IF laws in pilot requirements definition process and/or training methodology Adverse weather in terms of heavy rain or icing conditions during take-off Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring of / and passive contribution to the PF duties Pilot triedness - Inadequate workload distribution If laws in pilot requirements definition process and/or training methodology Adverse weather in terms of PNF flight parameters / situation monitoring of / and passive contribution to the PF duties Pilot triedness - Inadequate workload distribution If laws in pilot requirements definition process and/or training methodology Lack of adherence to AFM limitations for Take-off Lack of adherence to AFM limitations for Take-off Lack of adherence to AFM limitations for Take-off Lack of adherence to AFM limitations for Take-off Lack of adherence to AFM limitations for Take-off Anadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY 203 surface condition. Snow / ice presence / or runway surface friction rate below minimum Failure to remember / assess crosswind component limit for prevailing runway condition Pilot tredness - Inadequate workload distribution Failure to remember / 17/0 & RTD procedure, aircraft handling Convective weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring of / Andverse weather in terms of heavy rain or icing conditions resu	handling Lack of adherence to AFM limitations for Take off Jack of adherence to AFM limitations for Take off Inadequate maintenance of RWY. Lack of adherence to ICAO Annes 14 in terms of RWY Jack of adherence to AFM limitations for Take off Inadequate maintenance of RWY. Lack of adherence to ICAO Annes 14 in terms of RWY Jack off adherence to AFM limitations for Take off Jack of Afference of AFM limitations for Take off Jack of adherence to AFM limitations for Take off Jack of adherence to AFM limitations for Take off Jack of adherence to AFM limitations for Take off Jack of adherence of AFM limitations for Take off Jack of Jack of AFM procedure and Jack of Jack of Jack of Jack of AFM Jack of	lack of adherence to AFM limitations for Take off lack of adherence to AFM limitations for Take off landequate maintenance of RWT. Lack of adherence to ICAO Annes 14 in terms of RWV surface condition. Now I/c presence for runway surface firction rate below minimum Failure to memerber / assess crosswind component limit for prevailing runway condition 167 9; 22; Poor application of 170 & RTD procedure, aircraft handling Convective weather in terms of heavy rain or icing conditions resulted with decreased RWY surface firction rate Lack of adherence to the SOP in terms of PWF flight parameters / situation monitoring Poor application of 170 & RTD procedure, sicraft handling Convective weather in terms of heavy rain or icing conditions resulted with decreased RWY surface firction rate Lack of adherence to the SOP in terms of PWF flight parameters / situation monitoring of / and passive contribution to the PG driftes Pilot tendenses - inadequate workload distribution



Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
1 TO04B111	System failure affecting aircraft configuration, controllability and/or flying qualities	25	7;			50; 51; 54; 55; 58; 59;
	Tire burst	80		_		60; 61; 62; 63
	Flaws in maintenance technician / airworthiness specialist requirements definition	149				
	process and/or training methodology					
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
	distribution Inadequate certification process and / or flaws in methodology concerning verification	358				
	of the system / product compliance with requirements - Landing gear components					
	Flaws in aircraft system maintenance process definition - Landing gear components.	377				
	Flaws in manufacturer quality control process - Landing gear components.	376				
2 TO04B112	System failure affecting aircraft configuration, controllability and/or flying qualities	25	7;			50; 51; 54; 55; 58; 59
	Tire burst	80				60; 61; 62; 63
	Flaws in maintenance technician / airworthiness specialist requirements definition	149				
	process and/or training methodology					
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358				
	Flaws in aircraft system maintenance process definition - Landing gear components.	377				
	Flaws in manufacturer quality control process - Landing gear components.	376				
3 TO04B121	System failure affecting aircraft configuration, controllability and/or flying qualities	25	7;			50; 51; 54; 55; 58; 59
+	Flaws in maintenance technician / airworthiness specialist requirements definition	149	+	+		60; 61; 62; 63
	process and/or training methodology	173		1		
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
	distribution	100	-			1
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing	196				
	control related system and components (incl. brake)					
	Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing	366				
	control related system and components (incl. brake).	265				
	Flaws in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake).	365				
4 TO04B122	System failure affecting aircraft configuration, controllability and/or flying qualities	25	7;			50; 51; 54; 55; 58; 59
	The book	00				60; 61; 62; 63
	Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition	80 149		+		
	process and/or training methodology	1.5				
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
	distribution	358				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	336				
	Flaws in aircraft system maintenance process definition - Landing gear components.	377				
	Flaws in manufacturer quality control process definition - Landing gear components.	376		+		
5 TO04B123	System failure affecting aircraft configuration, controllability and/or flying qualities	25	7;			50; 51; 54; 55; 58; 59
						60; 61; 62; 63
	Tire burst	80				
	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149				
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
	distribution					
	Inadequate certification process and / or flaws in methodology concerning verification	358				
	of the system / product compliance with requirements - Landing gear components			1		
	Flaws in aircraft system maintenance process definition - Landing gear components.	377				
	Flaws in manufacturer quality control process - Landing gear components.	376				
 	Take-off rejection	467	-			50 54 54 55 50 50
6 TO04B211	Pilot tiredness - Inadequate workload distribution	167	,,			50; 51; 54; 55; 58; 59 60; 61; 62; 63
	Flaws in pilot requirements definition process and/or training methodology	168				25, 52, 52, 65
	Poor application of T/O & RTO procedure, failure recognition and preparedness	209				
	System failure affecting aircraft configuration, controllability and/or flying qualities	25				
	Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition	80 149	+	+		+
	process and/or training methodology	149				
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
	distribution Inadequate certification process and / or flaws in methodology concerning verification	196		+		
	of the system / product compliance with requirements - marshalling/rolling/taxiing	130				
	control related system and components (incl. brake)					
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358				
	or the system / product compliance with requirements - Landing gear components					
	Flaws in aircraft system maintenance process definition - Landing gear components.	377	<u> </u>			
	Flaws in manufacturer quality control process - Landing gear components.	376				
	Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing	366				
	Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake). Flaws in manufacturer quality control process - marshalling/rolling/taxiing control	366 365				



Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
7 TO04B212	Pilot tiredness - Inadequate workload distribution	167	7;			50; 51; 54; 55; 58; 59; 60; 61; 62; 63
	Flaws in pilot requirements definition process and/or training methodology	168				
	Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207				
	System failure affecting aircraft configuration, controllability and/or flying qualities Tire burst	25 80				
	Flaws in maintenance technician / airworthiness specialist requirements definition	149				
	process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
	distribution					
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake)	196				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358				
	Flaws in aircraft system maintenance process definition - Landing gear components.	377				
	Flaws in manufacturer quality control process - Landing gear components. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing	376 366				
	control related system and components (incl. brake).					
	Flaws in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake).	365				
8 TO04B22	not identifiable at that lelvel		7;			50; 51; 54; 55; 58; 59
	System failure affecting aircraft configuration, controllability and/or flying qualities	25				60; 61; 62; 63
	Tire burst	80 149				
	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149				
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150				
	Inadequate certification process and / or flaws in methodology concerning verification	196				
	of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake) linadequate certification process and / or flaws in methodology concerning verification	358				
	of the system / product compliance with requirements - Landing gear components					
	Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components.	377 376		+		
	Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake).	366				
	Flaws in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake).	365				
9 TO04B31	Failure to maintain control (take-off rejected) not identifiable at the moment		7;			50; 51; 54; 55; 58; 59 60; 61; 62; 63
	System failure affecting aircraft configuration, controllability and/or flying qualities	25 80				
	Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition	149				
	process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
	distribution					
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake)	196				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358				
	Flaws in aircraft system maintenance process definition - Landing gear components.	377				
	Flaws in manufacturer quality control process - Landing gear components. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing	376 366				
	control related system and components (incl. brake).					
	Flaws in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake).	365				
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	168 207				
10 TO04B32	Poor application of T/O & RTO procedure, failure recognition and preparedness Pilot tiredness - Inadequate workload distribution	209 167	7;			50; 51; 54; 55; 58; 59 60; 61; 62; 63
	Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling	168 388				
	System failure affecting aircraft configuration, controllability and/or flying qualities	388 25				
	Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition	80 149				
	process and/or training methodology	149				
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
	distribution Inadequate certification process and / or flaws in methodology concerning verification	196				
	of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake)	95.				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358				



SPIs: System of Identifiable precursors Code SPIs: Technology SPIs: Human SPIs: Organisation Organisations 377 Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. 376 Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing 366 control related system and components (incl. brake). Flaws in manufacturer quality control process - marshalling/rolling/taxiing control 365 related system and components (incl. brake). Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision 207 Poor application of T/O & RTO procedure, failure recognition and preparedness 209 11 TO04B33 Pilot tiredness - Inadequate workload distribution 50; 51; 54; 55; 58; 59; 167 60: 61: 62: 63 Flaws in pilot requirements definition process and/or training methodology 168 Poor application of T/O & RTO procedure, aircraft handling 388 System failure affecting aircraft configuration, controllability and/or flying qualities 25 Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition 149 process and/or training methodology 150 Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution nadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake) nadequate certification process and / or flaws in methodology concerning verification 358 of the system / product compliance with requirements - Landing gear components Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components 376 Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing 366 control related system and components (incl. brake). Flaws in manufacturer quality control process - marshalling/rolling/taxiing control 365 related system and components (incl. brake). 167 Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology 168 Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision 207 Poor application of T/O & RTO procedure, failure recognition and preparedness 209 12 TO04B34 Pilot tiredness - Inadequate workload distribution 167 50; 51; 54; 55; 58; 59; 60; 61; 62; 63 Flaws in pilot requirements definition process and/or training methodology 168 Poor application of T/O & RTO procedure, aircraft handling 388 System failure affecting aircraft configuration, controllability and/or flying qualities 25 Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition 149 process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 distribution Inadequate certification process and / or flaws in methodology concerning verification 196 of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake) Inadequate certification process and / or flaws in methodology concerning verification 358 of the system / product compliance with requirements - Landing gear components Flaws in aircraft system maintenance process definition - Landing gear components. 377 Flaws in manufacturer quality control process - Landing gear components. 376 Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing 366 control related system and components (incl. brake). Flaws in manufacturer quality control process - marshalling/rolling/taxiing control 365 related system and components (incl. brake). Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision 207 Poor application of T/O & RTO procedure, failure recognition and preparedness 209 Failure to Achieve Maximum Braking (V<V1) 13 TO04B41 Convective weather - heavy rain resulted with wet RWY surface 75 50; 51; 54; 55; 58; 59; 60; 61; 62; 63 Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Gross error in takeoff weight entry and/or in V1 / VR speeds assessment 179 nadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice presence / or runway surface friction rate below High energy RTO rate is an indicator of improper Operator's policy for T/O operations. Poor application of T/O & RTO procedure, computation of T/O parameters 260 System failure affecting aircraft configuration, controllability and/or flying qualities 80 Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition 149 process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150



SPIs: System of Code Identifiable precursors No. SPIs: Technology SPIs: Human SPIs: Organisation Organisations Inadequate certification process and / or flaws in methodology concerning verification 196 of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake) Inadequate certification process and / or flaws in methodology concerning verification 358 of the system / product compliance with requirements - Landing gear components Flaws in aircraft system maintenance process definition - Landing gear components. 377 Flaws in manufacturer quality control process - Landing gear components 376 Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing 366 control related system and components (incl. brake). Flaws in manufacturer quality control process - marshalling/rolling/taxiing control 365 related system and components (incl. brake). Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision 207 Poor application of T/O & RTO procedure, failure recognition and preparedness 209 Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Poor application of T/O & RTO procedure, aircraft handling 388 14 TO04B42 50; 51; 54; 55; 58; 59; System failure affecting aircraft configuration, controllability and/or flying qualities 25 7; 9; 60; 61; 62; 63 Contaminated Runway Flaws in maintenance technician / airworthiness specialist requirements definition 149 process and/or training methodology 150 Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing 366 control related system and components (incl. brake). System failure affecting aircraft configuration, controllability and/or flying qualities Flaws in maintenance technician / airworthiness specialist requirements definition 149 process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake) nadequate certification process and / or flaws in methodology concerning verification 358 of the system / product compliance with requirements - Landing gear components Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components 376 Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing 366 control related system and components (incl. brake). Flaws in manufacturer quality control process - marshalling/rolling/taxiing control 365 related system and components (incl. brake). Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology 168 Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision 207 Poor application of T/O & RTO procedure, failure recognition and preparedness 209 Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Poor application of T/O & RTO procedure, aircraft handling 388 15 TO04B43 50; 51; 54; 55; 58; 59; Pilot tiredness - Inadequate workload distribution 167 28: 29: 30: 60; 61; 62; 63 Flaws in pilot requirements definition process and/or training methodology 168 Poor application of T/O & RTO procedure, braking initiation sequence 199 System failure affecting aircraft configuration, controllability and/or flying qualities Tire burst 80 149 Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload nadequate certification process and / or flaws in methodology concerning verification 196 of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake) Inadequate certification process and / or flaws in methodology concerning verification 358 of the system / product compliance with requirements - Landing gear components Flaws in aircraft system maintenance process definition - Landing gear components. 377 Flaws in manufacturer quality control process - Landing gear components 376 Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing 366 control related system and components (incl. brake). Flaws in manufacturer quality control process - marshalling/rolling/taxiing control 365 related system and components (incl. brake). Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision 207 Poor application of T/O & RTO procedure, failure recognition and preparedness 209 Pilot tiredness - Inadequate workload distribution 167



_	Codo	Identifiable procureers	No	SPIs: Technology	CDIc: Human	CDIs: Organisation	SPIs: System of
	Code	Identifiable precursors Flaws in pilot requirements definition process and/or training methodology	168	SPIS: Technology	SPIs: Human	SPIs: Organisation	Organisations
_		Poor application of T/O & RTO procedure, aircraft handling	388				
٧		Failure to Maintain control (take-off continued)	300				
16	TO04B51	not identifiable at that level	\top	7;			50; 51; 54; 55; 58; 5
							60; 61; 62; 63
\neg		System failure affecting aircraft configuration, controllability and/or flying qualities	25				
		Tire burst	80				
		Flaws in maintenance technician / airworthiness specialist requirements definition	149				
		process and/or training methodology					
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
		distribution					
		Inadequate certification process and / or flaws in methodology concerning verification	196				
		of the system / product compliance with requirements - marshalling/rolling/taxiing					
		control related system and components (incl. brake)					
		Inadequate certification process and / or flaws in methodology concerning verification	358				
		of the system / product compliance with requirements - Landing gear components					
		Flaws in aircraft system maintenance process definition - Landing gear components.	377				
		Flaws in manufacturer quality control process - Landing gear components.	376				
		Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing	366				
		control related system and components (incl. brake).					
		Flaws in manufacturer quality control process - marshalling/rolling/taxiing control	365				
		related system and components (incl. brake).					
17	TO04B52	Pilot tiredness - Inadequate workload distribution	167	7;			50; 51; 54; 55; 58; 5
'			\perp				60; 61; 62; 63
		Flaws in pilot requirements definition process and/or training methodology	168				
		Poor application of T/O & RTO procedure, aircraft handling	388				
		System failure affecting aircraft configuration, controllability and/or flying qualities	25				
		Tire burst	80				
		Flaws in maintenance technician / airworthiness specialist requirements definition	149				
_ '		process and/or training methodology	\perp				<u> </u>
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
_ '		distribution	\perp				
		Inadequate certification process and / or flaws in methodology concerning verification	196				
		of the system / product compliance with requirements - marshalling/rolling/taxiing					
		control related system and components (incl. brake)					
		Inadequate certification process and / or flaws in methodology concerning verification	358				
		of the system / product compliance with requirements - Landing gear components					
		Flaws in aircraft system maintenance process definition - Landing gear components.	377				
		Flaws in manufacturer quality control process - Landing gear components.	376				
		Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing	366				
		control related system and components (incl. brake).					
		Flaws in manufacturer quality control process - marshalling/rolling/taxiing control	365				
		related system and components (incl. brake).					
18	TO04B53	Pilot tiredness - Inadequate workload distribution	167	7;			50; 51; 54; 55; 58; 5
		· ·		,			60; 61; 62; 63
		Flaws in pilot requirements definition process and/or training methodology	168				
		Poor application of T/O & RTO procedure, aircraft handling	388				
		System failure affecting aircraft configuration, controllability and/or flying qualities	25				
		Tire burst	80				
		Flaws in maintenance technician / airworthiness specialist requirements definition	149				
		process and/or training methodology					
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
		, , , , , , , , , , , , , , , , , , ,	150				
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150 196				
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution					
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification					
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing	196				
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake)	196				
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake) Inadequate certification process and / or flaws in methodology concerning verification	196				
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake) Inadequate certification process and / or flaws in methodology concerning verification	196				
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake) Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Flaws in aircraft system maintenance process definition - Landing gear components.	196 358				
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake) Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components.	196 358 377				
_		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake) Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Flaws in aircraft system maintenance process definition - Landing gear components.	196 358 377 376				
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake) Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in aircraft system maintenance process - Landing gear components. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing	196 358 377 376				
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake) Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in amoufacturer quality control process - Landing gear components. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake).	196 358 377 376 366				
19	T004854	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake) Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake). Flaws in manufacturer quality control process - marshalling/rolling/taxiing control	196 358 377 376 366				50; 51; 54; 55; 58:
19	TO04854	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake) Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake).	358 377 376 366 365				50; 51; 54; 55; 58; 60; 61; 62; 63
19	T004854	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake) Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake).	358 377 376 366 365				
19	TO04854	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake) Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake). Flaws in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake). Pilot tiredness - Inadequate workload distribution	358 377 376 366 365				
19	T004854	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake) Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in aircraft system maintenance process - Landing gear components. Flaws in aircraft system maintenance process - Landing gear components. Flaws in aircraft system and components (incl. brake). Flaws in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake). Flaws in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake). Flaws in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake). Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling	358 377 376 366 365 167				
19	TO04854	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake) Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake). Flaws in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake). Flaws in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake). Flaws in pilot requirements definition process and/or training methodology	358 377 376 366 365 167 168 388				
19	TO04854	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake) Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake). Flaws in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake). Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling System failure affecting aircraft configuration, controllability and/or flying qualities Tire burst	358 377 376 366 365 167 168 388 25 80				50; 51; 54; 55; 58; 560; 61; 62; 63
19	T004854	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake) Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake). Flaws in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake). Flaws in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake). Flaws in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake). Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling System failure affecting aircraft configuration, controllability and/or flying qualities Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition	358 377 376 366 365 167 168 388 25				
19	TO04B54	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake) Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in inaufacturer quality control process - Landing gear components. Flaws in manufacturer quality control process definition - marshalling/rolling/taxiing control related system and components (incl. brake). Flaws in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake). Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling System failure affecting aircraft configuration, controllability and/or flying qualities Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	358 377 376 366 365 167 168 388 25 80 149				
19	T004854	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake) Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Flaws in manufacturer quality control process definition - marshalling/rolling/taxiing control related system and components (incl. brake). Flaws in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake). Flaws in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake). Flaws in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake). Flaws in pilot requirements definition process and/or training methodology System failure affecting aircraft configuration, controllability and/or flying qualities Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	358 377 376 366 365 167 168 388 25 80				
19	T004854	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake) Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components of the system / product compliance with requirements - Landing gear components. Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake). Flaws in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake). Pilot tiredness - inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling System failure affecting aircraft configuration, controllability and/or flying qualities Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	358 377 376 366 365 167 168 388 25 80 149				
19	TO04854	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake) Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components of the system / product compliance with requirements - Landing gear components. Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake). Flaws in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake). Flaws in maintenance technician / airworthiness and/or training methodology Poor application of T/O & RTO procedure, aircraft handling System failure affecting aircraft configuration, controllability and/or flying qualities Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification	358 377 376 366 365 167 168 388 25 80 149				
19	TO04854	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake) Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Flaws in manufacturer quality control process definition - marshalling/rolling/taxiing control related system and components (incl. brake). Flaws in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake). Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling System failure affecting aircraft configuration, controllability and/or flying qualities Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing	358 377 376 366 365 167 168 388 25 80 149				
19	T004854	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake) Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components of the system / product compliance with requirements - Landing gear components. Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Flaws in manufacturer quality control process definition - marshalling/rolling/taxiing control related system and components (incl. brake). Flaws in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake). Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling System failure affecting aircraft configuration, controllability and/or flying qualities Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake)	358 377 376 366 365 167 168 388 25 80 149 150				
19	T004854	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake) Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components of the system / product compliance with requirements - Landing gear components. Flaws in maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake). Flaws in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake). Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling System failure affecting aircraft configuration, controllability and/or flying qualities Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake) Inadequate certification process and / or flaws in methodology concerning verification of the system and components (incl. brake) Inadequate certification process and / or flaws in methodology concerning verification of the system and components (incl. brake)	358 377 376 366 365 167 168 388 25 80 149 150				
19	TO04854	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake) Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components of the system / product compliance with requirements - Landing gear components. Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Flaws in manufacturer quality control process definition - marshalling/rolling/taxiing control related system and components (incl. brake). Flaws in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake). Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling System failure affecting aircraft configuration, controllability and/or flying qualities Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake)	358 377 376 366 365 167 168 388 25 80 149 150				
19	T004854	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake) Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components of the system / product compliance with requirements - Landing gear components. Flaws in maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake). Flaws in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake). Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling System failure affecting aircraft configuration, controllability and/or flying qualities Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake) Inadequate certification process and / or flaws in methodology concerning verification of the system and components (incl. brake) Inadequate certification process and / or flaws in methodology concerning verification of the system and components (incl. brake)	358 377 376 366 365 167 168 388 25 80 149 150				



(Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
		Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing	366				
		control related system and components (incl. brake).					
		Flaws in manufacturer quality control process - marshalling/rolling/taxiing control	365				
FCD F (Cl.	related system and components (incl. brake).		T b l		0	Contain of
ESD 5	Lode	identifiable precursors	No.	Technology	Human	Organisation	System of Organisations
- 1		Incorrect configuration					
1 7	TO05B111	Pilot tiredness - Inadequate workload distribution	167		13; 22;	38; 41;	50; 51; 54; 55; 58; 5
							60; 61; 62; 63
		Flaws in pilot requirements definition process and/or training methodology	168				
		Lack of adherence to SOP for take-off procedure in terms of determining of aircraft	198				
		configuration.					
		Incorrect stab-trim setting	258				
2.7	TO05B112	Undetected incorrect takeoff configuration Pilot tiredness - Inadequate workload distribution	259 167		12. 22.	20. 41.	50; 51; 54; 55; 58; 5
2 1	10058112	Priot tiredness - madequate workload distribution	107		13; 22;	38; 41;	60; 61; 62; 63
		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				00, 01, 02, 03
		or / and passive contribution to the PF duties	131				
		Flaws in pilot requirements definition process and/or training methodology	168				
3 1	TO05B12	Unintuitive and / or error prone system manual - FMC	217		13; 22;	38; 41;	50; 51; 54; 55; 58; 5
							60; 61; 62; 63
		Pilot tiredness - Inadequate workload distribution	167				
		Flaws in pilot requirements definition process and/or training methodology	168				
4 1	TO05B21	Pilot tiredness - Inadequate workload distribution	167		13; 22;	38; 41;	50; 51; 54; 55; 58; 5
							60; 61; 62; 63
		Flaws in pilot requirements definition process and/or training methodology	168				
		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
		or / and passive contribution to the PF duties	_				1
		Lack of adherence to SOP for take-off procedure in terms of checking take-off	201				
		configuration before application of take-off power.			1		
5 1	TO05B22	Pilot tiredness - Inadequate workload distribution	167		13; 22;	38; 41;	50; 51; 54; 55; 58; 5
-		eta a tradicionale da Carre da	460				60; 61; 62; 63
		Flaws in pilot requirements definition process and/or training methodology	168				
II G 7	TO05B311	Take-off configuration warning Inadequate certification process and / or flaws in methodology concerning verification	229	2.	13; 22;	38; 41;	50; 51; 54; 55; 58; 5
اا	10036311	of the system / product compliance with requirements - TOCW System	229	3;	15, 22,	30, 41,	60; 61; 62; 63
-		Flaws in manufacturer quality control process - TOCW system components	222				00, 01, 02, 03
		System failure affecting aircraft configuration, controllability and/or flying qualities	25				
_		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
		or / and passive contribution to the PF duties					
		Unintuitive and / or error prone system manual - ground radar.	164				
		Unintuitive and / or error prone system manual - FMC	217				
		Flaws in pilot requirements definition process and/or training methodology	168				
		Lack of adherence to SOP for take-off procedure in terms of determining of aircraft	198				
		configuration.					
		Lack of adherence to SOP for take-off procedure in terms of checking take-off	201				
		configuration before application of take-off power.					
		Incorrect stab-trim setting	258				
		Undetected incorrect takeoff configuration	259	_			
7 1	TO05B312	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149	3;	13; 22;	38; 41;	50; 51; 54; 55; 58; 5
\rightarrow		Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				60; 61; 62; 63
		distribution	130				
\rightarrow		Flaws in aircraft system maintenance process definition - TOCW System	204				
_		System failure affecting aircraft configuration, controllability and/or flying qualities	25				
_		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
		or / and passive contribution to the PF duties					
\dashv		Unintuitive and / or error prone system manual - FMC	217				
		Pilot tiredness - Inadequate workload distribution	167				
		Flaws in pilot requirements definition process and/or training methodology	168				
		Lack of adherence to SOP for take-off procedure in terms of determining of aircraft	198				
		configuration.	\perp				
\neg		Lack of adherence to SOP for take-off procedure in terms of checking take-off	201				
		configuration before application of take-off power.					
		Incorrect stab-trim setting	258				
		Undetected incorrect takeoff configuration	259				1
8 7	TO05B313	Incorrect use of automation - TOCW System	192		13; 22;	38; 41;	50; 51; 54; 55; 58;
-+							60; 61; 62; 63
\rightarrow		Pilot tiredness - Inadequate workload distribution	167		1		+
\rightarrow		Flaws in pilot requirements definition process and/or training methodology	168		+		+
		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151				
+		Unintuitive and / or error prone system manual - TOCW	219		+		
\dashv		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151		+		+
		or / and passive contribution to the PF duties	131				
+		Unintuitive and / or error prone system manual - FMC	217		+		+
\dashv		Pilot tiredness - Inadequate workload distribution	167				+
\dashv		Flaws in pilot requirements definition process and/or training methodology	168				+
\dashv		Lack of adherence to SOP for take-off procedure in terms of determining of aircraft	198				
		configuration.	-55				
-		Lack of adherence to SOP for take-off procedure in terms of checking take-off	201				1
		configuration before application of take-off power.					
		Incorrect stab-trim setting	258				



Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
9 TO05B321	Flaws in manufacturer quality control process - Power supply system components	238	2;	13; 22;	38; 41;	50; 51; 54; 55; 58; 59
	to decrease of the state of the	220				60; 61; 62; 63
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system	230				
	components					
	System failure affecting the operation of primary instruments / displays or standby	26				
	instruments					
	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
	or / and passive contribution to the PF duties					
	Unintuitive and / or error prone system manual - FMC	217				
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft	168 198				
	configuration.	198				
	Lack of adherence to SOP for take-off procedure in terms of checking take-off	201				
	configuration before application of take-off power.	201				
	Incorrect stab-trim setting	258				
	Undetected incorrect takeoff configuration	259				
10 TO05B322	Flaws in maintenance technician / airworthiness specialist requirements definition	149	2;	13; 22;	38; 41;	50; 51; 54; 55; 58; 59
	process and/or training methodology					60; 61; 62; 63
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
	distribution					
	Flaws in aircraft system maintenance process definition - Electrical wiring System	252				
	System failure affecting the operation of primary instruments / displays or standby instruments	26	1			
+	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151		+		1
	or / and passive contribution to the PF duties	131				
	Unintuitive and / or error prone system manual - FMC	217				
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168	<u> </u>			
	Lack of adherence to SOP for take-off procedure in terms of determining of aircraft	198				
	configuration.					
	Lack of adherence to SOP for take-off procedure in terms of checking take-off	201				
	configuration before application of take-off power.					
	Incorrect stab-trim setting	258				
11 TO05B33	Undetected incorrect takeoff configuration not identifiable at the moment	259		13; 22;	38; 41;	50; 51; 54; 55; 58; 59
11 1003633	not identifiable at the moment			15, 22,	30, 41,	60; 61; 62; 63
	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				00, 01, 02, 03
	or / and passive contribution to the PF duties					
	Unintuitive and / or error prone system manual - FMC	217				
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168				
	Lack of adherence to SOP for take-off procedure in terms of determining of aircraft	198				
	configuration.					
	Lack of adherence to SOP for take-off procedure in terms of checking take-off	201				
	configuration before application of take-off power.	258				
	Incorrect stab-trim setting Undetected incorrect takeoff configuration	259				
III	Flight crew rejects take-off	233				
12 TO05B411	• /					
12 10030411	[Cautions / warnings (genuine or spurious) that may lead to a low-speed or high-speed	46		13; 22;	38; 41;	50; 51; 54; 55; 58; 59
12 10036411	Cautions / warnings (genuine or spurious) that may lead to a low-speed or high-speed rejected take-off	46		13; 22;	38; 41;	50; 51; 54; 55; 58; 59 60; 61; 62; 63
12 10036411		46 151		13; 22;	38; 41;	
12 10038411	rejected take-off Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties			13; 22;	38; 41;	
12 10036411	rejected take-off Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution	151 167		13; 22;	38; 41;	
12 10036411	rejected take-off Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	151 167 168		13; 22;	38; 41;	
12 10035411	rejected take-off Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution	151 167		13; 22;	38; 41;	
12 10035411	rejected take-off Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	151 167 168 207		13; 22;	38; 41;	
12 10035411	rejected take-off Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151 167 168		13; 22;	38; 41;	
12 10036411	rejected take-off Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151 167 168 207		13; 22;	38; 41;	
12 10036411	rejected take-off Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC	151 167 168 207 151		13; 22;	38; 41;	
12 10036411	rejected take-off Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151 167 168 207		13; 22;	38; 41;	
12 10036411	rejected take-off Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution	151 167 168 207 151 217 167		13; 22;	38; 41;	
12 10036411	rejected take-off Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	151 167 168 207 151 217 167 168		13; 22;	38; 41;	
12 10036411	rejected take-off Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off	151 167 168 207 151 217 167 168		13; 22;	38; 41;	
12 10036411	rejected take-off Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	151 167 168 207 151 217 167 168 198		13; 22;	38; 41;	
12 10036411	rejected take-off Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting	151 167 168 207 151 217 167 168 198 201		13; 22;	38; 41;	
	rejected take-off Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration	151 167 168 207 151 217 167 168 198 201 258 259				60; 61; 62; 63
13 TO05B412	rejected take-off Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration Cautions / warnings (genuine or spurious) that may lead to a low-speed or high-speed	151 167 168 207 151 217 167 168 198 201 258 259		13; 22;	38; 41;	60; 61; 62; 63 50; 51; 54; 55; 58; 58
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	rejected take-off Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration Cautions / warnings (genuine or spurious) that may lead to a low-speed or high-speed rejected take-off Pilot tiredness - Inadequate workload distribution	151 167 168 207 151 217 167 168 198 201 258 259 46				60; 61; 62; 63 50; 51; 54; 55; 58; 58
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	rejected take-off Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration Cautions / warnings (genuine or spurious) that may lead to a low-speed or high-speed rejected take-off Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	151 167 168 207 151 217 167 168 198 201 258 259 46				60; 61; 62; 63 50; 51; 54; 55; 58; 58
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	rejected take-off Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration Cautions / warnings (genuine or spurious) that may lead to a low-speed or high-speed rejected take-off Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.	151 167 168 207 151 217 167 168 198 201 258 259 46 167 168 207 151 217 167 168 207				50; 51; 54; 55; 58; 59
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Code	Identifiable precursors		SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
14 TO05B4	Undetected incorrect takeoff configuration 142 not identifiable at the moment	259		13; 22;	38; 41;	50; 51; 54; 55; 58; 5 60; 61; 62; 63
	Lack of adherence to the SOP in terms of PNF flight parameters / situation mor	nitoring 151				00, 01, 02, 03
	or / and passive contribution to the PF duties	217				
	Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution	217 167				
_	Flaws in pilot requirements definition process and/or training methodology	168				
	Lack of adherence to SOP for take-off procedure in terms of determining of airc					
	configuration.					
	Lack of adherence to SOP for take-off procedure in terms of checking take-off	201				
	configuration before application of take-off power.					
	Incorrect stab-trim setting	258				
n.	Undetected incorrect takeoff configuration	259				
15 TO05B5	Failure to achieve maximum braking Adverse weather in terms of heavy rain or icing conditions resulted with decrea	45		12, 22,	38; 41;	48; 50; 51; 54; 55; 5
15 100585	RWY surface friction rate	ased 45		13; 22;	38; 41;	59; 60; 61; 62; 63
	Pilot tiredness - Inadequate workload distribution	167	+			33, 00, 01, 02, 03
	Flaws in pilot requirements definition process and/or training methodology	168	+			
	Poor application of T/O & RTO procedure, use of MET / ATIS information, aircra					
	handling					
	Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms	s of RWY 203				
	surface condition. Snow / ice presence / or runway surface friction rate below minimum					
	Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms	s of RWY 203				
	surface condition. Snow / ice presence / or runway surface friction rate below					
_	minimum		1			
	High energy RTO rate is an indicator of improper Operator's policy for T/O oper	rations. 211	1			
-	Construction to be of the state	4=0	1	+		
_	Gross error in takeoff weight entry and/or in V1 / VR speeds assessment	179 nitoring 151		+		+
	Lack of adherence to the SOP in terms of PNF flight parameters / situation mor or / and passive contribution to the PF duties	intoring 151	1			
+	Unintuitive and / or error prone system manual - FMC	217	+	+		
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168				
	Lack of adherence to SOP for take-off procedure in terms of determining of airc					
	configuration.					
	Lack of adherence to SOP for take-off procedure in terms of checking take-off	201				
	configuration before application of take-off power.					
	Incorrect stab-trim setting	258				
	Undetected incorrect takeoff configuration	259				
	Cautions / warnings (genuine or spurious) that may lead to a low-speed or hig	gh-speed 46				
	rejected take-off					
	Lack of adherence to the SOP in terms of PNF flight parameters / situation mor	nitoring 151				
_	or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution	167				+
_	Flaws in pilot requirements definition process and/or training methodology	168				
	Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP					
16 TO05B5	, , , , , , , , , , , , , , , , , , , ,		7; 9;	13; 22;	38; 41;	50; 51; 54; 55; 58; 60; 61; 62; 63
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168				
	Flaws in aircraft system maintenance process definition - marshalling/rolling/ta	axiing 366				
	control related system and components (incl. brake).					
	Lack of adherence to the SOP in terms of PNF flight parameters / situation mor					+
	or / and passive contribution to the PE duties	nitoring 151				
	or / and passive contribution to the PF duties					
	Unintuitive and / or error prone system manual - FMC	217				
	Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution	217 167				
	Unintuitive and / or error prone system manual - FMC	217 167 168				
	Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	217 167 168				
	Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of airc configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off	217 167 168				
	Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aird configuration.	217 167 168 craft 198				
	Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of airc configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting	217 167 168 craft 198 201 258				
	Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of airc configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration	217 167 168 craft 198 201 258 259				
	Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of airc configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration Cautions / warnings (genuine or spurious) that may lead to a low-speed or hig	217 167 168 craft 198 201 258 259				
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	Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of airc configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration Cautions / warnings (genuine or spurious) that may lead to a low-speed or hig rejected take-off Lack of adherence to the SOP in terms of PNF flight parameters / situation mor	217 167 168 craft 198 201 258 259 259 26h-speed 46				
	Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of airc configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration Cautions / warnings (genuine or spurious) that may lead to a low-speed or hig rejected take-off Lack of adherence to the SOP in terms of PNF flight parameters / situation mor or / and passive contribution to the PF duties	217 167 168 craft 198 201 258 259 259 259 46 nitoring 151				
	Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of airc configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration Cautions / warnings (genuine or spurious) that may lead to a low-speed or hig rejected take-off Lack of adherence to the SOP in terms of PNF flight parameters / situation mor or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution	217 167 168 craft 198 201 258 259 gh-speed 46 nitoring 151				
	Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of airc configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration Cautions / warnings (genuine or spurious) that may lead to a low-speed or hig rejected take-off Lack of adherence to the SOP in terms of PNF flight parameters / situation mor or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	217 167 168 craft 198 201 258 259 gh-speed 46 nitoring 151 167				
	Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of airc configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration Cautions / warnings (genuine or spurious) that may lead to a low-speed or hig rejected take-off Lack of adherence to the SOP in terms of PNF flight parameters / situation mor or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution	217 167 168 craft 198 201 258 259 gh-speed 46 nitoring 151 167				
17 TOOSBS	Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of airc configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration Cautions / warnings (genuine or spurious) that may lead to a low-speed or hig rejected take-off Lack of adherence to the SOP in terms of PNF flight parameters / situation mor or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP.	217 167 168 craft 198 201 258 259 gh-speed 46 nitoring 151 167		13; 22;	28; 29; 30; 38; 41;	
17 TO0585	Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of airx configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration Cautions / warnings (genuine or spurious) that may lead to a low-speed or hig rejected take-off Lack of adherence to the SOP in terms of PNF flight parameters / situation mor or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP-	217 167 168 craft 198 201 258 259 gh-speed 46 nitoring 151 167 168 decision 207		13; 22;	28; 29; 30; 38; 41;	50; 51; 54; 55; 58; 60; 61; 62; 63
17 TOOSBS	Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of airc configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration Cautions / warnings (genuine or spurious) that may lead to a low-speed or hig rejected take-off Lack of adherence to the SOP in terms of PNF flight parameters / situation mor or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP.	217 167 168 craft 198 201 258 259 gh-speed 46 nitoring 151 167 decision 207		13; 22;	28; 29; 30; 38; 41;	
17 TO0585	Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of airc configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration Cautions / warnings (genuine or spurious) that may lead to a low-speed or hig rejected take-off Lack of adherence to the SOP in terms of PNF flight parameters / situation mor or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP.	217 167 168 201 258 259 3h-speed 46 hitoring 151 167 168 decision 207 167		13; 22;	28; 29; 30; 38; 41;	
17 TOOSBS	Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of airc configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration Cautions / warnings (genuine or spurious) that may lead to a low-speed or hig rejected take-off Lack of adherence to the SOP in terms of PNF flight parameters / situation mor or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP of the process of	217 167 168 201 258 259 3h-speed 46 hitoring 151 167 168 decision 207 167		13; 22;	28; 29; 30; 38; 41;	
17 TO0585	Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of airt configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration Cautions / warnings (genuine or spurious) that may lead to a low-speed or hig rejected take-off Lack of adherence to the SOP in terms of PNF flight parameters / situation mor or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP. Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, braking initiation sequence Lack of adherence to the SOP in terms of PNF flight parameters / situation mor	217 167 168 201 258 259 3h-speed 46 hitoring 151 167 168 decision 207 167		13; 22;	28; 29; 30; 38; 41;	
17 TOO585	Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of airx configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration Cautions / warnings (genuine or spurious) that may lead to a low-speed or hig rejected take-off Lack of adherence to the SOP in terms of PNF flight parameters / situation mor or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, braking initiation sequence Lack of adherence to the SOP in terms of PNF flight parameters / situation mor or / and passive contribution to the PF duties	217 167 168 279 279 279 279 279 279 279 279 279 279		13; 22;	28; 29; 30; 38; 41;	
17 TOOSBS	Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of airc configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration Cautions / warnings (genuine or spurious) that may lead to a low-speed or hig rejected take-off Lack of adherence to the SOP in terms of PNF flight parameters / situation mor or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP. 153 Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, braking initiation sequence Lack of adherence to the SOP in terms of PNF flight parameters / situation mor or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC	217 167 168 craft 198 201 258 259 gh-speed 46 nitoring 151 167 168 199 nitoring 151 217 167 168		13; 22;	28; 29; 30; 38; 41;	50; 51; 54; 55; 58; 60; 61; 62; 63



Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	Lack of adherence to SOP for take-off procedure in terms of checking take-off	201	, , , , , , , , , , , , , , , , , , ,			T
	configuration before application of take-off power.					
	Incorrect stab-trim setting	258 259				
	Undetected incorrect takeoff configuration Cautions / warnings (genuine or spurious) that may lead to a low-speed or high-speed					
	rejected take-off	10				
	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
	or / and passive contribution to the PF duties					
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168				
	Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207				
V	Aircraft stalls after rotation					
18 TO05B61	not identifiable at that level		2; 3;	13; 22;	38; 41;	50; 51; 54; 55; 58; 5
						60; 61; 62; 63
	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
	or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC	217				
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168				
	Lack of adherence to SOP for take-off procedure in terms of determining of aircraft	198				
	configuration.					
	Lack of adherence to SOP for take-off procedure in terms of checking take-off	201				
	configuration before application of take-off power.	250				+
	Incorrect stab-trim setting Undetected incorrect takeoff configuration	258 259				
_	System failure affecting aircraft configuration, controllability and/or flying qualities	259				
	System failure affecting all clart configuration, controllability and/or hying qualities System failure affecting the operation of primary instruments / displays or standby	26				
	instruments		<u> </u>			
	Flaws in maintenance technician / airworthiness specialist requirements definition	149				
	process and/or training methodology	_				
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
	distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
	or / and passive contribution to the PF duties	131				
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168				
	Incorrect use of automation - TOCW System	192				
	Flaws in aircraft system maintenance process definition - TOCW System	204				
	Unintuitive and / or error prone system manual - TOCW	219				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System	229				
	Inadequate certification process and / or flaws in methodology concerning verification	230				
	of the system / product compliance with requirements - Power supply system	250				
	components					
	Flaws in manufacturer quality control process - Power supply system components	238				
19 TO05B622	Flaws in aircraft system maintenance process definition - Electrical wiring System	252	2.2	42.22	20.44	FO. F1. F4. FF. F0. I
19 10058622	Lack of adherence to SOP in terms of awareness on supporting systems warning - stickshaker	197	2; 3;	13; 22;	38; 41;	50; 51; 54; 55; 58; 5 60; 61; 62; 63
	Pilot tiredness - Inadequate workload distribution	167				00, 01, 02, 03
	Flaws in pilot requirements definition process and/or training methodology	168				
	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
	or / and passive contribution to the PF duties					
	Unintuitive and / or error prone system manual - FMC	217				
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft	168 198				
	configuration.	130				
	Lack of adherence to SOP for take-off procedure in terms of checking take-off	201				
	configuration before application of take-off power.	L	<u> </u>			
	Incorrect stab-trim setting	258				
	Undetected incorrect takeoff configuration	259				
	System failure affecting aircraft configuration, controllability and/or flying qualities	25	-			+
	System failure affecting the operation of primary instruments / displays or standby instruments	26				
+	Flaws in maintenance technician / airworthiness specialist requirements definition	149				+
	process and/or training methodology	1-49				
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
	distribution					
	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
	or / and passive contribution to the PF duties	4.0-				+
	Pilot tiredness - Inadequate workload distribution	167				-
	Flaws in pilot requirements definition process and/or training methodology Incorrect use of automation - TOCW System	168 192				
	Flaws in aircraft system maintenance process definition - TOCW System	204				
	Unintuitive and / or error prone system manual - TOCW	219				1
	Inadequate certification process and / or flaws in methodology concerning verification	229				İ
	of the system / product compliance with requirements - TOCW System	L				
	Inadequate certification process and / or flaws in methodology concerning verification	230				
				1	1	1
	of the system / product compliance with requirements - Power supply system					
	of the system / product compliance with requirements - Power supply system components	220				
	of the system / product compliance with requirements - Power supply system components Flaws in manufacturer quality control process - Power supply system components	238				
20 TO05B6211	of the system / product compliance with requirements - Power supply system components	252	2; 3;	13; 22;	38; 41;	50; 51; 54; 55; 58;



Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	Flaws in aircraft system maintenance process definition - stickshaker	136			0	
	Flaws in maintenance technician / airworthiness specialist requirements definition	149				
	process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
	distribution					
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - stickshaker system	161				
	components					
	Flaws in manufacturer quality control process - Stickshaker system components	266				
	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
	or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC	217				
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168				
	Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.	198				
	Lack of adherence to SOP for take-off procedure in terms of checking take-off	201				
	configuration before application of take-off power. Incorrect stab-trim setting	258				
	Undetected incorrect takeoff configuration	259				
	System failure affecting aircraft configuration, controllability and/or flying qualities	25				
	System failure affecting the operation of primary instruments / displays or standby	26				
	instruments Flaws in maintenance technician / airworthiness specialist requirements definition	149		+		
	process and/or training methodology			1	1	
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150		1	1	
	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151		+	+	
	or / and passive contribution to the PF duties			1	1	
	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168		+	+	
	Incorrect use of automation - TOCW System	192				
	Flaws in aircraft system maintenance process definition - TOCW System	204				
	Unintuitive and / or error prone system manual - TOCW	219				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System	229				
	Inadequate certification process and / or flaws in methodology concerning verification	230				
	of the system / product compliance with requirements - Power supply system					
	components Flaws in manufacturer quality control process - Power supply system components	238				
	Flaws in aircraft system maintenance process definition - Electrical wiring System	252				
21 TO05B6212	Contaminated wing	12	2; 3; 6;	13; 22;	38; 41;	48; 50; 51; 54; 55; 58
	Extreme icing conditions encounter	20				59; 60; 61; 62; 63
	System failure affecting the operation of primary instruments / displays or standby	26				
	instruments					
	Inadequate aircraft de-icing / anti-icing Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing	180 208		+		
	Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.	210				
	Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT)	212				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - antiice fluid HOT	213				
	or the system, product compliance managements andice had no					
	Applied de-icing / anti-icing method is not sufficient for predicted conditions	228				
	Lack of adherence to SOP in terms of aircraft icing monitoring Lack of adherence to SOP in terms of de-icing / anti-icing procedures.	231				
	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
	and an advantage of the street					
	or / and passive contribution to the PF duties					
	Unintuitive and / or error prone system manual - FMC	217				
1	Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution	217 167 168				
	Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft	167				
	Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.	167 168 198				
	Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft	167 168				
	Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off	167 168 198				
	Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration	167 168 198 201 258 259				
	Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration System failure affecting aircraft configuration, controllability and/or flying qualities	167 168 198 201 258 259 25				
	Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration	167 168 198 201 258 259				
	Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby instruments Flaws in maintenance technician / airworthiness specialist requirements definition	167 168 198 201 258 259 25				
	Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby instruments Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	167 168 198 201 258 259 25 26				
	Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby instruments Flaws in maintenance technician / airworthiness specialist requirements definition	167 168 198 201 258 259 25 26				
	Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby instruments Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	167 168 198 201 258 259 25 26				
	Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby instruments Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	167 168 198 201 258 259 25 26 149 150				
	Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby instruments Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution	167 168 198 201 258 259 25 26 149 150				
	Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby instruments Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Incorrect use of automation - TOCW System	167 168 198 201 258 259 25 26 149 150 151 167 168 192				
	Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting aircraft configuration, set in the silvent of the set o	167 168 198 201 258 259 25 26 149 150 151 167 168 192 204				
	Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Incorrect stab-trim setting Undetected incorrect takeoff configuration System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby instruments Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Incorrect use of automation - TOCW System	167 168 198 201 258 259 25 26 149 150 151 167 168 192				



SPIs: System of Code Identifiable precursors No. SPIs: Technology SPIs: Human SPIs: Organisation Organisations Inadequate certification process and / or flaws in methodology concerning verification 230 of the system / product compliance with requirements - Power supply system components Flaws in manufacturer quality control process - Power supply system components 238 Flaws in aircraft system maintenance process definition - Electrical wiring System 252 Flight crew fails to regain control 22 TO05B71 2; 3; 6; 13: 22: 38; 41; 48; 50; 51; 54; 55; 58; ot identifiable at that level 59; 60; 61; 62; 63 Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology 168 Lack of adherence to SOP for take-off procedure in terms of determining of aircraft 198 configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off 201 configuration before application of take-off power. Incorrect stab-trim setting 258 Undetected incorrect takeoff configuration 259 System failure affecting aircraft configuration, controllability and/or flying qualities 25 System failure affecting the operation of primary instruments / displays or standby 26 instruments Flaws in maintenance technician / airworthiness specialist requirements definition 149 process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Incorrect use of automation - TOCW System 192 Flaws in aircraft system maintenance process definition - TOCW System 204 Unintuitive and / or error prone system manual - TOCW 219 nadequate certification process and / or flaws in methodology concerning verification 229 of the system / product compliance with requirements - TOCW System nadequate certification process and / or flaws in methodology concerning verification 230 of the system / product compliance with requirements - Power supply system components Flaws in manufacturer quality control process - Power supply system components Flaws in aircraft system maintenance process definition - Electrical wiring System 252 12 Contaminated wing Extreme icing conditions encounter 20 System failure affecting the operation of primary instruments / displays or standby 26 instruments Flaws in aircraft system maintenance process definition - stickshaker 136 Flaws in maintenance technician / airworthiness specialist requirements definition 149 process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 distribution Inadequate certification process and / or flaws in methodology concerning verification 161 of the system / product compliance with requirements - stickshaker system components Pilot tiredness - Inadequate workload distribution 167 168 Flaws in pilot requirements definition process and/or training methodology 180 Inadequate aircraft de-icing / anti-icing Lack of adherence to SOP in terms of awareness on supporting systems warning 197 stickshaker Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing 208 Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure. 210 Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT) 212 nadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - antiice fluid HOT Applied de-icing / anti-icing method is not sufficient for predicted conditions 228 Lack of adherence to SOP in terms of aircraft icing monitoring 231 Lack of adherence to SOP in terms of de-icing / anti-icing procedures 23 TO05B72 167 2; 3; 6; 13; 22; 38; 41; 48; 50; 51; 54; 55; 58; Pilot tiredness - Inadequate workload distribution 59; 60; 61; 62; 63 Flaws in pilot requirements definition process and/or training methodology 168 Lack of adherence to AFM in terms of emergency procedures - stall recovery 292 Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties 217 Unintuitive and / or error prone system manual - FMC Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Lack of adherence to SOP for take-off procedure in terms of determining of aircraft 198 configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off 201 configuration before application of take-off power. Incorrect stab-trim setting 258 Undetected incorrect takeoff configuration 259 System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby



SPIs: System of Code Identifiable precursors No. SPIs: Technology SPIs: Human **SPIs: Organisation** Organisations Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties 167 Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology 168 Incorrect use of automation - TOCW System 192 Flaws in aircraft system maintenance process definition - TOCW System 204 219 Unintuitive and / or error prone system manual - TOCW nadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System Inadequate certification process and / or flaws in methodology concerning verification 230 of the system / product compliance with requirements - Power supply system components Flaws in manufacturer quality control process - Power supply system components 238 Flaws in aircraft system maintenance process definition - Electrical wiring System 252 Contaminated wing Extreme icing conditions encounter 20 System failure affecting the operation of primary instruments / displays or standby 26 instruments Flaws in aircraft system maintenance process definition - stickshaker 136 Flaws in maintenance technician / airworthiness specialist requirements definition 149 process and/or training methodology 150 Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Inadequate certification process and / or flaws in methodology concerning verification 161 of the system / product compliance with requirements - stickshaker system components Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Inadequate aircraft de-icing / anti-icing Lack of adherence to SOP in terms of awareness on supporting systems warning stickshaker Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing 208 Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure 210 Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT) 212 Inadequate certification process and / or flaws in methodology concerning verification 213 of the system / product compliance with requirements - antiice fluid HOT Applied de-icing / anti-icing method is not sufficient for predicted conditions 228 Lack of adherence to SOP in terms of aircraft icing monitoring 231 Lack of adherence to SOP in terms of de-icing / anti-icing procedures. 232 24 TO05B73 Flaws in pilot requirements definition process and/or training methodology 168 2; 3; 6; 13; 22; 38; 41; 48; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63 Pilot tiredness - Inadequate workload distribution 167 Lack of adherence to AFM in terms of emergency procedures - stall recovery 292 Inadequate stall recovery procedure for the aircraft 152 151 Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Unintuitive and / or error prone system manual - FMC 217 Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off 201 configuration before application of take-off power Incorrect stab-trim setting 258 Undetected incorrect takeoff configuration 259 System failure affecting aircraft configuration, controllability and/or flying qualities System failure affecting the operation of primary instruments / displays or standby nstruments 149 Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties 167 Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology 168 Incorrect use of automation - TOCW System Flaws in aircraft system maintenance process definition - TOCW System 204 Unintuitive and / or error prone system manual - TOCW 219 nadequate certification process and / or flaws in methodology concerning verification 229 of the system / product compliance with requirements - TOCW System Inadequate certification process and / or flaws in methodology concerning verification 230 of the system / product compliance with requirements - Power supply system Flaws in manufacturer quality control process - Power supply system components 238 Flaws in aircraft system maintenance process definition - Electrical wiring System 252 12 Contaminated wing Extreme icing conditions encounter System failure affecting the operation of primary instruments / displays or standby



	Code	Identifiable precursors	No	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
T	Couc	Flaws in aircraft system maintenance process definition - stickshaker	136	Ji is. recimology	Ji is. Human	51 13. Organisation	Organisations
		Flaws in maintenance technician / airworthiness specialist requirements definition	149				
		process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
		distribution Inadequate certification process and / or flaws in methodology concerning verification	161				
		of the system / product compliance with requirements - stickshaker system components					
		Pilot tiredness - Inadequate workload distribution	167				
		Flaws in pilot requirements definition process and/or training methodology	168				
		Inadequate aircraft de-icing / anti-icing	180				
		Lack of adherence to SOP in terms of awareness on supporting systems warning -	197				
		stickshaker					
		Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing	208				
		Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.	210				
		Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT)	212				
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - antiice fluid HOT	213				
			228				
		Applied de-icing / anti-icing method is not sufficient for predicted conditions	231				
_		Lack of adherence to SOP in terms of aircraft icing monitoring Lack of adherence to SOP in terms of de-icing / anti-icing procedures.	232				+
25	TO05B74	Flaws in pilot requirements definition process and/or training methodology	-	2; 3; 6;	13; 22;	38; 41;	48; 50; 51; 54; 55; 58
23	1003874			2, 3, 0,	13, 22,	36, 41,	59; 60; 61; 62; 63
		Pilot tiredness - Inadequate workload distribution	167				1
		Lack of adherence to AFM in terms of emergency procedures - stall recovery	292				+
		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
		or / and passive contribution to the PF duties	217				
		Unintuitive and / or error prone system manual - FMC	217				
		Pilot tiredness - Inadequate workload distribution	167				
-		Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft	168 198	 			
		configuration.	150				
_		Lack of adherence to SOP for take-off procedure in terms of checking take-off	201		+		+
		configuration before application of take-off power.	201				
		Incorrect stab-trim setting	258				
		Undetected incorrect takeoff configuration	259				
		System failure affecting aircraft configuration, controllability and/or flying qualities	25				
		System failure affecting the operation of primary instruments / displays or standby	26				
		instruments					
		Flaws in maintenance technician / airworthiness specialist requirements definition	149				
		process and/or training methodology					
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
		distribution					
		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
		or / and passive contribution to the PF duties					
		Pilot tiredness - Inadequate workload distribution	167				
		Flaws in pilot requirements definition process and/or training methodology	168				
		Incorrect use of automation - TOCW System	192				
_		Flaws in aircraft system maintenance process definition - TOCW System	204				
_		Unintuitive and / or error prone system manual - TOCW	219				
		Inadequate certification process and / or flaws in methodology concerning verification	229				
_		of the system / product compliance with requirements - TOCW System	220				
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system	230				
		components Flaws in manufacturer quality control process - Power supply system components	238				
_		Flaws in aircraft system maintenance process definition - Electrical wiring System	252				
_		Contaminated wing	12				
		Extreme icing conditions encounter	20				
		System failure affecting the operation of primary instruments / displays or standby	26				
		instruments		1			
		Flaws in aircraft system maintenance process definition - stickshaker	136				
		Flaws in maintenance technician / airworthiness specialist requirements definition	149				
		process and/or training methodology		1			
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
		distribution					
		Inadequate certification process and / or flaws in methodology concerning verification	161				
		of the system / product compliance with requirements - stickshaker system		1			
		components	L	<u> </u>			
		Pilot tiredness - Inadequate workload distribution	167				
		Flaws in pilot requirements definition process and/or training methodology	168				
		Inadequate aircraft de-icing / anti-icing	180				
		Lack of adherence to SOP in terms of awareness on supporting systems warning -	197				
		stickshaker	_				
		Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing	208				
		Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.	210				
		Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT)	212				
		Inadequate certification process and / or flaws in methodology concerning verification	213	1			
		of the system / product compliance with requirements - antiice fluid HOT		1			
			-				
		Applied de-icing / anti-icing method is not sufficient for predicted conditions	228				
		Lack of adherence to SOP in terms of aircraft icing monitoring	231				1
		Lack of adherence to SOP in terms of de-icing / anti-icing procedures.	232				

Wildlife incursion

Linking of precursors and SPIs



SPIs: System of Code Identifiable precursors No. SPIs: Technology SPIs: Human SPIs: Organisation Organisations FSD 9 Code identifiable precursors No. Technology Organisation Organisations Single Engine Failure 1 TO09B11 nadequate certification process and / or flaws in methodology concerning verification 454 13: 18: 22: 31: 38: 41: of the system / product compliance with requirements - Engine systems and / or 50; 51; 54; 55; 58; 59; 60; 61; 62; 63 components Flaws in manufacturer quality control process - Engine systems and / or components 458 Flaws in aircraft system maintenance process definition - Engine systems and / or 463 components 2 TO09B12 50: 51: 54: 55: 58: 59: Flaws in maintenance technician / airworthiness specialist requirements definition 149 13; 18; 22; 31; 38; 41; 60; 61; 62; 63 process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 distribution Inadequate certification process and / or flaws in methodology concerning verification 454 of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components Flaws in aircraft system maintenance process definition - Engine systems and / or 463 omponents 3 TO09B13 149 9; 13; 18; 22; 31; 38; 41; 50; 51; 54; 55; 58; 59; Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology 60; 61; 62; 63 Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 nadequate certification process and / or flaws in methodology concerning verification 151 of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components 458 Flaws in aircraft system maintenance process definition - Engine systems and / or 463 components 4 TO09B14 Wildlife incursion 13: 18: 22: 31: 38: 41: 50: 51: 54: 55: 58: 59: 60; 61; 62; 63 Bird strike 34 Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition 149 process and/or training methodology 150 Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction 162 orocedure Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of 216 contaminations Inadequate certification process and / or flaws in methodology concerning verification 358 of the system / product compliance with requirements - Landing gear components Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence 401 integrity monitoring 377 Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components. 376 Flight crew rejects take-off 5 TO09B211 Pilot tiredness - Inadequate workload distribution 167 13: 18: 22: 31: 38: 41: 50: 51: 54: 55: 58: 59: 60: 61: 62: 63 Flaws in pilot requirements definition process and/or training methodology 168 Poor application of T/O & RTO procedure, failure recognition and preparedness 209 Wildlife incursion 34 Bird strike Contaminated Runway 39 Tire burst 80 Flaws in maintenance technician / airworthiness specialist requirements definition 149 process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction 162 procedure Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of 216 contaminations. Inadequate certification process and / or flaws in methodology concerning verification 358 of the system / product compliance with requirements - Landing gear components Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence 401 integrity monitoring nadequate certification process and / or flaws in methodology concerning verification 454 of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components 458 Flaws in aircraft system maintenance process definition - Engine systems and / or 463 components Flaws in aircraft system maintenance process definition - Landing gear components. 377 Flaws in manufacturer quality control process - Landing gear components. 376 6 TO09B212 Pilot tiredness - Inadequate workload distribution 167 9 13: 18: 22: 31: 38: 41: 50; 51; 54; 55; 58; 59; 60; 61; 62; 63 Flaws in pilot requirements definition process and/or training methodology 168 Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision



Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	Bird strike	34	- Isi recimiology	0.15.1144	J. Ior Organisation	- Gramoutions
	Contaminated Runway	39				
	Tire burst	80				
	Flaws in maintenance technician / airworthiness specialist requirements definition	149				
	process and/or training methodology	-				
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
	distribution					
	Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction	162				
	procedure					
	Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence or	f 216				
	contaminations.	'				
	Inadequate certification process and / or flaws in methodology concerning verification	358				
	of the system / product compliance with requirements - Landing gear components					
	Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence	401				
	integrity monitoring					
	Inadequate certification process and / or flaws in methodology concerning verification	454				
	of the system / product compliance with requirements - Engine systems and / or					
	components					
	Flaws in manufacturer quality control process - Engine systems and / or components	458				
	Flaws in aircraft system maintenance process definition - Engine systems and / or	463				
	components	"				
	Flaws in aircraft system maintenance process definition - Landing gear components.	377				
	Flaws in manufacturer quality control process - Landing gear components.	376			1	1
7 TO09B22	not identifiable at that level	1	9;	13; 18; 22;	31; 38; 41;	50; 51; 54; 55; 58; 59
		1	,	-,,,	-,,,	60; 61; 62; 63
	Wildlife incursion	5			1	,, 02, 03
	Bird strike	34			1	
+	Contaminated Runway	39		+		+
+	Tire burst	80	+	+		
+	Flaws in maintenance technician / airworthiness specialist requirements definition	149	+	+		+
	process and/or training methodology	149				
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150	+	+		
	distribution	130				
	Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction	162				
	procedure	102				
	Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence or	£ 21C				
	contaminations.	1216				
		250				
	Inadequate certification process and / or flaws in methodology concerning verification	358				
	of the system / product compliance with requirements - Landing gear components					
	Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence	401				
	integrity monitoring					
	Inadequate certification process and / or flaws in methodology concerning verification	454				
	of the system / product compliance with requirements - Engine systems and / or					
	components	_				
	Flaws in manufacturer quality control process - Engine systems and / or components	458				
	Flaws in aircraft system maintenance process definition - Engine systems and / or	463				
	components	_				
	Flaws in aircraft system maintenance process definition - Landing gear components.	377				
	Flaws in manufacturer quality control process - Landing gear components.	376				
III	Flight crew fails to maintain control (Take-off rejected)	_				
8 TO09B31	not identifiable at the moment		9;	13; 18; 22;	31; 38; 41;	50; 51; 54; 55; 58; 5
		1.	1	1	1	60; 61; 62; 63
	Wildlife incursion	5	1	1	1	1
	Bird strike	34	1	1	1	
	Contaminated Runway	39	1	1		1
	Tire burst	80	ļ	1		
	Flaws in maintenance technician / airworthiness specialist requirements definition	149				
	process and/or training methodology	_				
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150			1	
	distribution	_	ļ	1		
	Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction	162				
	procedure	_				
	Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence or	f 216				
	contaminations.					
	Inadequate certification process and / or flaws in methodology concerning verification	358				
	of the system / product compliance with requirements - Landing gear components	1				
		\perp		<u> </u>	<u> </u>	
	Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence	401				
	integrity monitoring	1	<u> </u>	<u> </u>		<u> </u>
	Inadequate certification process and / or flaws in methodology concerning verification	454				
	of the system / product compliance with requirements - Engine systems and / or	1				
	components	1				
	Flaws in manufacturer quality control process - Engine systems and / or components	458				
	Flaws in aircraft system maintenance process definition - Engine systems and / or	463				
	components	1				
	Flaws in aircraft system maintenance process definition - Landing gear components.	377	1	1		
	Flaws in manufacturer quality control process - Landing gear components.	376		1		
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168		+		
	Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision				1	
	. 11. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	-0/				
	Poor application of T/O & RTO procedure, failure recognition and preparedness	209		+		+



	Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
9	TO09B32	Pilot tiredness - Inadequate workload distribution	167	9;	13; 18; 22;	31; 38; 41;	50; 51; 54; 55; 58; 59;
							60; 61; 62; 63
		Flaws in pilot requirements definition process and/or training methodology	168				
		Poor application of T/O & RTO procedure, aircraft handling	388				
		Wildlife incursion	5				
		Bird strike Contaminated Runway	34 39				
		Tire burst	80				
		Flaws in maintenance technician / airworthiness specialist requirements definition	149				
		process and/or training methodology					
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
		distribution					
		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction	162				
		procedure					
		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of	216				
		contaminations. Inadequate certification process and / or flaws in methodology concerning verification	358				
		of the system / product compliance with requirements - Landing gear components	338				
		of the system / product compliance with requirements - Landing gear components					
		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence	401				
		integrity monitoring					
		Inadequate certification process and / or flaws in methodology concerning verification	454				
		of the system / product compliance with requirements - Engine systems and / or				1	1
		components					
		Flaws in manufacturer quality control process - Engine systems and / or components	458				
		Flaws in aircraft system maintenance process definition - Engine systems and / or	463			1	1
	ļ	components	0.55	1		1	
	 	Flaws in aircraft system maintenance process definition - Landing gear components.	377	-			+
	+	Flaws in manufacturer quality control process - Landing gear components.	376	1	-	+	+
	-	Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	167 168	-		+	+
	 		207	<u> </u>	 	+	+
		Tool application of 1/0 at 110 procedure, dance include to 501, criteria 101 5101 decision	207				
		Poor application of T/O & RTO procedure, failure recognition and preparedness	209				
10	TO09B33	Pilot tiredness - Inadequate workload distribution	167	9;	13; 18; 22;	31; 38; 41;	50; 51; 54; 55; 58; 59;
							60; 61; 62; 63
		Flaws in pilot requirements definition process and/or training methodology	168				
		Poor application of T/O & RTO procedure, aircraft handling	388				
		Wildlife incursion	5				
		Bird strike	34				
		Contaminated Runway	39				
		Tire burst	80 149				
		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149				
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
		distribution					
		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction	162				
		procedure					
		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of	216				
		contaminations.					
		Inadequate certification process and / or flaws in methodology concerning verification	358				
		of the system / product compliance with requirements - Landing gear components					
		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence	401				
		integrity monitoring	401				
	 	Inadequate certification process and / or flaws in methodology concerning verification	454				+
		of the system / product compliance with requirements - Engine systems and / or	.5.				
		components					
		Flaws in manufacturer quality control process - Engine systems and / or components	458				
		Flaws in aircraft system maintenance process definition - Engine systems and / or	463				
	ļ	components					
		Flaws in aircraft system maintenance process definition - Landing gear components.	377				
	ļ	Flaws in manufacturer quality control process - Landing gear components.	376	1		1	
	1	Pilot tiredness - Inadequate workload distribution	167	-	-	+	+
			100	I control of the cont	1		+
		Flaws in pilot requirements definition process and/or training methodology	168		i e		
			168 207				
		Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207				
11	TO09B34	Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Poor application of T/O & RTO procedure, failure recognition and preparedness	207 209	9:	13: 18: 22:	31: 38: 41:	50; 51; 54: 55: 58: 59:
11	.TO09B34	Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207	9;	13; 18; 22;	31; 38; 41;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63
11	TO09B34	Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Poor application of T/O & RTO procedure, failure recognition and preparedness	207 209	9;	13; 18; 22;	31; 38; 41;	
11	TO09B34	Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Poor application of T/O & RTO procedure, failure recognition and preparedness Pilot tiredness - Inadequate workload distribution	207 209 167	9;	13; 18; 22;	31; 38; 41;	
11	TO09B34	Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Poor application of T/O & RTO procedure, failure recognition and preparedness Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling Wildlife incursion	207 209 167 168 388 5	9;	13; 18; 22;	31; 38; 41;	
11	TO09B34	Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Poor application of T/O & RTO procedure, failure recognition and preparedness Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling Wildlife incursion Bird strike	207 209 167 168 388 5 34	9;	13; 18; 22;	31; 38; 41;	
11	TO09B34	Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Poor application of T/O & RTO procedure, failure recognition and preparedness Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling Wildlife incursion Bird strike Contaminated Runway	207 209 167 168 388 5 34 39	9;	13; 18; 22;	31; 38; 41;	
11	T009B34	Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Poor application of T/O & RTO procedure, failure recognition and preparedness Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling Wildlife incursion Bird strike Contaminated Runway Tire burst	209 167 168 388 5 34 39 80	9;	13; 18; 22;	31; 38; 41;	
11	T009B34	Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Poor application of T/O & RTO procedure, failure recognition and preparedness Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling Wildlife incursion Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition	207 209 167 168 388 5 34 39	9;	13; 18; 22;	31; 38; 41;	
11	TO09B34	Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Poor application of T/O & RTO procedure, failure recognition and preparedness Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling Wildlife incursion Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	207 209 167 168 388 5 34 39 80 149	9;	13; 18; 22;	31; 38; 41;	
111	TO09B34	Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Poor application of T/O & RTO procedure, failure recognition and preparedness Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling Wildlife incursion Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	209 167 168 388 5 34 39 80	9;	13; 18; 22;	31; 38; 41;	
11	ТОО9ВЗ4	Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Poor application of T/O & RTO procedure, failure recognition and preparedness Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling Wildlife incursion Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	207 209 167 168 388 5 34 39 80 149	9;	13; 18; 22;	31; 38; 41;	
11	TO09B34	Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Poor application of T/O & RTO procedure, failure recognition and preparedness Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling Wildlife incursion Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	207 209 167 168 388 5 34 39 80 149	9;	13; 18; 22;	31; 38; 41;	
11	TO09B34	Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision Poor application of T/O & RTO procedure, failure recognition and preparedness Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Poor application of T/O & RTO procedure, aircraft handling Wildlife incursion Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction	207 209 167 168 388 5 34 39 80 149 150	9;	13; 18; 22;	31; 38; 41;	



SPIs: System of Code Identifiable precursors No. SPIs: Technology SPIs: Human SPIs: Organisation Organisations Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence 401 integrity monitoring Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or Flaws in manufacturer quality control process - Engine systems and / or components 458 Flaws in aircraft system maintenance process definition - Engine systems and / or 463 components 377 Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components 376 Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision 207 Poor application of T/O & RTO procedure, failure recognition and preparedness 209 Failure to achieve maximum braking 12 TO09B41 75 31; 38; 41; 13; 18; 22; 50; 51; 54; 55; 58; 59; Convective weather - heavy rain resulted with wet RWY surface 9; 60; 61; 62; 63 167 Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology 168 Gross error in takeoff weight entry and/or in V1 / VR speeds assessment 179 nadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY 203 surface condition. Snow / ice presence / or runway surface friction rate below High energy RTO rate is an indicator of improper Operator's policy for T/O operations. 211 Poor application of T/O & RTO procedure, computation of T/O parameters 260 Wildlife incursion 34 Bird strike Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition 149 process and/or training methodology 150 Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction 162 rocedure Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of 216 contaminations. Inadequate certification process and / or flaws in methodology concerning verification 358 of the system / product compliance with requirements - Landing gear components Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence 401 integrity monitoring Inadequate certification process and / or flaws in methodology concerning verification 454 of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components 458 Flaws in aircraft system maintenance process definition - Engine systems and / or 463 components Flaws in aircraft system maintenance process definition - Landing gear components. 377 Flaws in manufacturer quality control process - Landing gear components. 376 Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology 168 Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision 207 Poor application of T/O & RTO procedure, failure recognition and preparedness 209 Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology 168 Poor application of T/O & RTO procedure, aircraft handling 388 13 TO09B42 13: 18: 22: 31: 38: 41: 50: 51: 54: 55: 58: 59: System failure affecting aircraft configuration, controllability and/or flying qualities 25 7: 9: 60; 61; 62; 63 Contaminated Runway Flaws in maintenance technician / airworthiness specialist requirements definition 149 process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 distribution Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of 216 contaminations. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing 366 control related system and components (incl. brake). Wildlife incursion 34 Bird strike Contaminated Runway 80 Flaws in maintenance technician / airworthiness specialist requirements definition 149 process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction 162



SPIs: System of Code Identifiable precursors No. SPIs: Technology SPIs: Human SPIs: Organisation Organisations Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of 216 contaminations. Inadequate certification process and / or flaws in methodology concerning verification 358 of the system / product compliance with requirements - Landing gear components Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring Inadequate certification process and / or flaws in methodology concerning verification 454 of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components 458 Flaws in aircraft system maintenance process definition - Engine systems and / or components Flaws in aircraft system maintenance process definition - Landing gear components. 377 Flaws in manufacturer quality control process - Landing gear components. 376 Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision 207 209 Poor application of T/O & RTO procedure, failure recognition and preparedness 167 Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology 168 Poor application of T/O & RTO procedure, aircraft handling 50: 51: 54: 55: 58: 59: 14 TO09B43 Pilot tiredness - Inadequate workload distribution 167 13: 18: 22: 28; 29; 30; 31; 38; 41; 60; 61; 62; 63 Flaws in pilot requirements definition process and/or training methodology 168 Poor application of T/O & RTO procedure, braking initiation sequence 199 Wildlife incursion Bird strike 34 Contaminated Runway 39 Tire burst 80 Flaws in maintenance technician / airworthiness specialist requirements definition 149 process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction 162 procedure Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of 216 contaminations. nadequate certification process and / or flaws in methodology concerning verification 358 of the system / product compliance with requirements - Landing gear components Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence 401 integrity monitoring nadequate certification process and / or flaws in methodology concerning verification 454 of the system / product compliance with requirements - Engine systems and / or components 458 Flaws in manufacturer quality control process - Engine systems and / or components Flaws in aircraft system maintenance process definition - Engine systems and / or 463 components Flaws in aircraft system maintenance process definition - Landing gear components. 377 Flaws in manufacturer quality control process - Landing gear components. 376 Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision 207 Poor application of T/O & RTO procedure, failure recognition and preparedness 209 Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Poor application of T/O & RTO procedure, aircraft handling 388 Figiht crew fails to maintain control (Take-off continued) 15 TO09B51 not identifiable at that level 13; 18; 22; 31; 38; 41; 50-51-54-55-58-59-60; 61; 62; 63 Wildlife incursion 34 Bird strike Contaminated Runway Flaws in maintenance technician / airworthiness specialist requirements definition 149 process and/or training methodology 150 Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction 162 procedure Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of 216 contaminations Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence 401 integrity monitoring Inadequate certification process and / or flaws in methodology concerning verification 454 of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components



SPIs: System of Code Identifiable precursors No. SPIs: Technology SPIs: Human SPIs: Organisation Organisations Flaws in aircraft system maintenance process definition - Engine systems and / or 463 components Flaws in aircraft system maintenance process definition - Landing gear components. 377 376 Flaws in manufacturer quality control process - Landing gear components. 16 TO09B52 13; 18; 22; 31; 38; 41; 50; 51; 54; 55; 58; 59; Pilot tiredness - Inadequate workload distribution 167 60; 61; 62; 63 Flaws in pilot requirements definition process and/or training methodology 168 Lack of adherence to AFM in terms of emergency procedures - stall recovery 292 Wildlife incursion 34 Bird strike 39 Contaminated Runway Tire burst Flaws in maintenance technician / airworthiness specialist requirements definition 149 process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of 216 contaminations. Inadequate certification process and / or flaws in methodology concerning verification 358 of the system / product compliance with requirements - Landing gear components Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence 401 ntegrity monitoring Inadequate certification process and / or flaws in methodology concerning verification 454 of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components 458 Flaws in aircraft system maintenance process definition - Engine systems and / or 463 components Flaws in aircraft system maintenance process definition - Landing gear components. 377 Flaws in manufacturer quality control process - Landing gear components. 17 TO09B53 167 13; 18; 22; 31; 38; 41; 50: 51: 54: 55: 58: 59: Pilot tiredness - Inadequate workload distribution 60: 61: 62: 63 Flaws in pilot requirements definition process and/or training methodology 168 Lack of adherence to AFM in terms of emergency procedures - stall recovery 292 Wildlife incursion Bird strike 34 Contaminated Runway 39 Tire burst 80 Flaws in maintenance technician / airworthiness specialist requirements definition 149 process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction 162 procedure Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of 216 contaminations. Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence 401 integrity monitoring Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components Flaws in manufacturer quality control process - Engine systems and / or components 458 Flaws in aircraft system maintenance process definition - Engine systems and / or 463 components Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components 376 18 TO09B54 Pilot tiredness - Inadequate workload distribution 167 9 13: 18: 22: 31: 38: 41: 50: 51: 54: 55: 58: 59: 60: 61: 62: 63 Flaws in pilot requirements definition process and/or training methodology 168 Lack of adherence to AFM in terms of emergency procedures - stall recovery 292 Wildlife incursion Bird strike 34 Contaminated Runway 39 Tire burst 80 Flaws in maintenance technician / airworthiness specialist requirements definition 149 process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 distribution Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction 162 procedure Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of 216 Inadequate certification process and / or flaws in methodology concerning verification 358 of the system / product compliance with requirements - Landing gear components Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence 401 integrity monitoring



	Code	Identifiable precursors		SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or	454				
		components Flaws in manufacturer quality control process - Engine systems and / or components	458				
		Flaws in aircraft system maintenance process definition - Engine systems and / or components	463				
		Flaws in aircraft system maintenance process definition - Landing gear components.	377				
		Flaws in manufacturer quality control process - Landing gear components.	376				
SD 10	Code	identifiable precursors	No.	Technology	Human	Organisation	System of Organisations
1	T04004444	Pitch Control Problem	467		22		FO. F1. F4. FF. F0. F0
1	TO10B1111	Pilot tiredness - Inadequate workload distribution	167		22;		50; 51; 54; 55; 58; 59 60; 61; 62; 63
		Flaws in pilot requirements definition process and/or training methodology	168				
		Lack of adherence to SOP for take-off procedure in terms of determining of aircraft	198				
		configuration. Incorrect stab-trim setting	258				
2	TO10B1112	Pilot tiredness - Inadequate workload distribution	167		22;		50; 51; 54; 55; 58; 5 60; 61; 62; 63
		Flaws in pilot requirements definition process and/or training methodology	168				00, 01, 02, 03
		Lack of adherence to SOP for take-off procedure in terms of speed bug checklist	419				
	T0400443	preparation and verification.	454		22		FO. F1. F4. FF. F0. F
3	TO10B112	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151		22;		50; 51; 54; 55; 58; 5 60; 61; 62; 63
		Pilot tiredness - Inadequate workload distribution	167				
		Flaws in pilot requirements definition process and/or training methodology	168				
4	TO10B113	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151		22;		50; 51; 54; 55; 58; 5 60; 61; 62; 63
		Pilot tiredness - Inadequate workload distribution	167				50, 01, 02, 03
		Flaws in pilot requirements definition process and/or training methodology	168				
5	TO10B12	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151		22;		50; 51; 54; 55; 58; 5 60; 61; 62; 63
		Pilot tiredness - Inadequate workload distribution	167				
		Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of checking take-off	168 201				
		configuration before application of take-off power.					
		Slow rotation (i.e., low pitch rate)	371				
6	TO10B1311	System failure affecting the operation of primary instruments / displays or standby instruments	26	3;	22;		50; 51; 54; 55; 58; 5 60; 61; 62; 63
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FCS system or components	420				
7	TO10B1312	System failure affecting the operation of primary instruments / displays or standby instruments	26	3;	22;		50; 51; 54; 55; 58; 59 60; 61; 62; 63
8	TO10B1313	Flaws in manufacturer quality control process - FCS system components System failure affecting the operation of primary instruments / displays or standby	421 26	3;	22;		50; 51; 54; 55; 58; 59
		instruments Flaws in maintenance technician / airworthiness specialist requirements definition	149				60; 61; 62; 63
		process and/or training methodology	143				
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
		distribution	422				
		Flaws in aircraft system maintenance process definition - FCS systems or components	422				
9	TO10B1314	Wildlife incursion	5	3; 7;	22;		49; 50; 51; 54; 55; 5 59; 60; 61; 62; 63
		Bird strike	34 39				
		Contaminated Runway Tire burst	80				
		Flaws in maintenance technician / airworthiness specialist requirements definition	149				
		process and/or training methodology					
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150				
		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction	162				
		procedure					
		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.	216				
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358				
		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence	401		1		
		integrity monitoring					
		Flaws in aircraft system maintenance process definition - Landing gear components. Flaws in manufacturer quality control process - Landing gear components.	377 376	 	+		
10	TO10B132	System failure affecting the operation of primary instruments / displays or standby	26	3;	22;		50; 51; 54; 55; 58; 5
		instruments	271	-	+		60; 61; 62; 63
		Slow rotation (i.e., low pitch rate) Inadequate certification process and / or flaws in methodology concerning verification	371 420		+		
		of the system / product compliance with requirements - FCS system or components	420				
		Flaws in manufacturer quality control process - FCS system components	421	 	+		
		Flaws in aircraft system maintenance process definition - FCS systems or components	422				
Ш		Flight crew rejects to take-off					
11	TO10B211	Pilot tiredness - Inadequate workload distribution	167	3; 7;	22;		49; 50; 51; 54; 55; 5



	ode	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
		Flaws in pilot requirements definition process and/or training methodology	168				
		Poor application of T/O & RTO procedure, failure recognition and preparedness	209				
		Wildlife incursion	5				
		System failure affecting the operation of primary instruments / displays or standby	26				
		instruments					
		Bird strike	34				
		Contaminated Runway	39				
		Tire burst	80				
		Flaws in maintenance technician / airworthiness specialist requirements definition	149				
		process and/or training methodology					
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
		distribution					
		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
		or / and passive contribution to the PF duties					
		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction	162				
		procedure					
		Pilot tiredness - Inadequate workload distribution	167				
		Flaws in pilot requirements definition process and/or training methodology	168				
		Lack of adherence to SOP for take-off procedure in terms of determining of aircraft	198				
		configuration.					
		Lack of adherence to SOP for take-off procedure in terms of checking take-off	201				
		configuration before application of take-off power.					
		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of	216				
		contaminations.					
		Incorrect stab-trim setting	258			<u> </u>	
		Inadequate certification process and / or flaws in methodology concerning verification	358	1			
		of the system / product compliance with requirements - Landing gear components	1	1			
			_		ļ		
		Slow rotation (i.e., low pitch rate)	371				
		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence	401				
		integrity monitoring	_				
		Lack of adherence to SOP for take-off procedure in terms of speed bug checklist	419	1			
		preparation and verification.	_		ļ		
			420	1			
		of the system / product compliance with requirements - FCS system or components					
		Flaws in manufacturer quality control process - FCS system components	421				
		Flaws in aircraft system maintenance process definition - FCS systems or components	422				
		Flaws in aircraft system maintenance process definition - Landing gear components.	377				
		Flaws in manufacturer quality control process - Landing gear components.	376				
12 TO:	10B212	Pilot tiredness - Inadequate workload distribution	167	3; 7;	22;		49; 50; 51; 54; 55; 58;
							59; 60; 61; 62; 63
		Flaws in pilot requirements definition process and/or training methodology	168				
		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207				
		Wildlife incursion	5				
		System failure affecting the operation of primary instruments / displays or standby	26				
		instruments					
		Bird strike	34				
		Contaminated Runway	39				
		Tire burst	80				
			_				
		Flaws in maintenance technician / airworthiness specialist requirements definition	149				
		process and/or training methodology	149				
		process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload	_				
		process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	149 150				
		process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	149				
		process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	149 150 151				
		process and/or training methodology Maintenance technician / ainworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction	149 150				
		process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	149 150 151 162				
		process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Pilot tiredness - Inadequate workload distribution	149 150 151 162 167				
		process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology	149 150 151 162 167 168				
		process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft	149 150 151 162 167				
		process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.	149 150 151 162 167 168 198				
		process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off	149 150 151 162 167 168				
		process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	149 150 151 162 167 168 198 201				
		process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of	149 150 151 162 167 168 198 201				
		process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power. Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of contaminations.	149 150 151 162 167 168 198 201				
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SPIs: System of Organisations Code Identifiable precursors No. SPIs: Technology SPIs: Human **SPIs: Organisation** 13 TO10B22 not identifiable at that level 22: 49; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63 Wildlife incursion System failure affecting the operation of primary instruments / displays or standby 26 instruments Bird strike 34 Contaminated Runway 39 Tire burst 80 Flaws in maintenance technician / airworthiness specialist requirements definition 149 process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction 162 procedure Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology 168 Lack of adherence to SOP for take-off procedure in terms of determining of aircraft 198 configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off 201 configuration before application of take-off power. Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence o 216 contaminations. ncorrect stab-trim setting nadequate certification process and / or flaws in methodology concerning verification 358 of the system / product compliance with requirements - Landing gear components Slow rotation (i.e., low pitch rate) 371 Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence 401 integrity monitoring Lack of adherence to SOP for take-off procedure in terms of speed bug checklist 419 preparation and verification. nadequate certification process and / or flaws in methodology concerning verification 420 of the system / product compliance with requirements - FCS system or components Flaws in manufacturer quality control process - FCS system components 421 Flaws in aircraft system maintenance process definition - FCS systems or components 422 Flaws in aircraft system maintenance process definition - Landing gear components. 377 Flaws in manufacturer quality control process - Landing gear components. 376 Failure to achieve maximum braking 14 TO10B31 Convective weather - heavy rain resulted with wet RWY surface 75 22; 49; 50; 51; 54; 55; 58; 3; 7; 59; 60; 61; 62; 63 Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Gross error in takeoff weight entry and/or in V1 / VR speeds assessment 179 Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY 203 surface condition. Snow / ice presence / or runway surface friction rate below minimum High energy RTO rate is an indicator of improper Operator's policy for T/O operations. 211 Poor application of T/O & RTO procedure, computation of T/O parameters 260 Wildlife incursion System failure affecting the operation of primary instruments / displays or standby instruments Bird strike 34 Contaminated Runway 39 Tire burst 80 Flaws in maintenance technician / airworthiness specialist requirements definition 149 process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure 167 Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology 168 Lack of adherence to SOP for take-off procedure in terms of determining of aircraft 198 configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off 201 configuration before application of take-off power. Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of 216 contaminations. Incorrect stab-trim setting 258 nadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Slow rotation (i.e., low pitch rate) 371 Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence 401 integrity monitoring Lack of adherence to SOP for take-off procedure in terms of speed bug checklist 419



SPIs: System of Code Identifiable precursors No. SPIs: Technology SPIs: Human SPIs: Organisation Organisations Inadequate certification process and / or flaws in methodology concerning verification 420 of the system / product compliance with requirements - FCS system or components Flaws in manufacturer quality control process - FCS system components 421 Flaws in aircraft system maintenance process definition - FCS systems or components 422 Flaws in aircraft system maintenance process definition - Landing gear components. 377 Flaws in manufacturer quality control process - Landing gear components. 376 Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision 207 Poor application of T/O & RTO procedure, failure recognition and preparedness 209 15 TO10B32 49: 50: 51: 54: 55: 58: System failure affecting aircraft configuration, controllability and/or flying qualities 25 3: 7: 22: 59: 60: 61: 62: 63 39 Contaminated Runway Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 distribution Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of 216 contaminations. Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing 366 control related system and components (incl. brake) Wildlife incursion System failure affecting the operation of primary instruments / displays or standby 26 instruments Bird strike 34 Contaminated Runway 39 Tire burst 80 Flaws in maintenance technician / airworthiness specialist requirements definition 149 process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties 162 Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology 168 Lack of adherence to SOP for take-off procedure in terms of determining of aircraft 198 configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off 201 configuration before application of take-off power. Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of 216 contaminations. Incorrect stab-trim setting 258 nadequate certification process and / or flaws in methodology concerning verification 358 of the system / product compliance with requirements - Landing gear components Slow rotation (i.e., low pitch rate) 371 Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence 401 ntegrity monitoring Lack of adherence to SOP for take-off procedure in terms of speed bug checklist 419 preparation and verification. nadequate certification process and / or flaws in methodology concerning verification 420 of the system / product compliance with requirements - FCS system or components Flaws in manufacturer quality control process - FCS system components 421 Flaws in aircraft system maintenance process definition - FCS systems or components 422 Flaws in aircraft system maintenance process definition - Landing gear components. 377 Flaws in manufacturer quality control process - Landing gear components. 376 Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision 207 209 Poor application of T/O & RTO procedure, failure recognition and preparedness 16 TO10B33 49; 50; 51; 54; 55; 58; Pilot tiredness - Inadequate workload distribution 167 3: 7: 22: 28: 29: 30: 59; 60; 61; 62; 63 Flaws in pilot requirements definition process and/or training methodology 168 Poor application of T/O & RTO procedure, braking initiation sequence 199 Wildlife incursion System failure affecting the operation of primary instruments / displays or standby 26 instruments 34 Bird strike Contaminated Runway 80 Flaws in maintenance technician / airworthiness specialist requirements definition 149 process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties



SPIs: System of Code Identifiable precursors No. SPIs: Technology SPIs: Human SPIs: Organisation Organisations Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction 162 orocedure Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Lack of adherence to SOP for take-off procedure in terms of determining of aircraft 198 configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off 201 configuration before application of take-off power Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of 216 contaminations. Incorrect stab-trim setting 258 nadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Slow rotation (i.e., low pitch rate) 371 Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence 401 integrity monitoring Lack of adherence to SOP for take-off procedure in terms of speed bug checklist 419 preparation and verification. nadequate certification process and / or flaws in methodology concerning verification 420 of the system / product compliance with requirements - FCS system or components Flaws in manufacturer quality control process - FCS system components Flaws in aircraft system maintenance process definition - FCS systems or components 422 Flaws in aircraft system maintenance process definition - Landing gear components. 377 Flaws in manufacturer quality control process - Landing gear components. 376 Pilot tiredness - Inadequate workload distribution Flaws in pilot requirements definition process and/or training methodology 168 Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision 207 Poor application of T/O & RTO procedure, failure recognition and preparedness 209 Aircraft fails to rotate and lift off 17 TO10B41 49: 50: 51: 54: 55: 58: Pilot tiredness - Inadequate workload distribution 3; 7; 59: 60: 61: 62: 63 Flaws in pilot requirements definition process and/or training methodology 168 Poor application of T/O & RTO procedure, aircraft handling 388 Wildlife incursion System failure affecting the operation of primary instruments / displays or standby 26 instruments Bird strike 34 Contaminated Runway 39 Tire burst 80 Flaws in maintenance technician / airworthiness specialist requirements definition 149 process and/or training methodology Maintenance technician / airworthiness specialist tiredness - Inadequate workload 150 distribution Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 151 or / and passive contribution to the PF duties Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction 162 procedure Pilot tiredness - Inadequate workload distribution 167 Flaws in pilot requirements definition process and/or training methodology 168 Lack of adherence to SOP for take-off procedure in terms of determining of aircraft 198 configuration. Lack of adherence to SOP for take-off procedure in terms of checking take-off 201 configuration before application of take-off power. Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of 216 contaminations. Incorrect stab-trim setting 258 nadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components Slow rotation (i.e., low pitch rate) 371 Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence 401 integrity monitoring Lack of adherence to SOP for take-off procedure in terms of speed bug checklist 419 preparation and verification. Inadequate certification process and / or flaws in methodology concerning verification 420 of the system / product compliance with requirements - FCS system or components Flaws in manufacturer quality control process - FCS system components Flaws in aircraft system maintenance process definition - FCS systems or components 422 Flaws in aircraft system maintenance process definition - Landing gear components 377 Flaws in manufacturer quality control process - Landing gear components. 376 18 TO10B42 Pilot tiredness - Inadequate workload distribution 167 3; 7; 22; 49; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63 Flaws in pilot requirements definition process and/or training methodology 168 Poor application of T/O & RTO procedure, aircraft handling 388 Wildlife incursion System failure affecting the operation of primary instruments / displays or standby 26 instruments 34 Bird strike Contaminated Runway 39



Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	Organisations
	Tire burst	80				
	Flaws in maintenance technician / airworthiness specialist requirements definition	149				
	process and/or training methodology					
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload	150				
	distribution					
	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring	151				
	or / and passive contribution to the PF duties					
	Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction	162				
	procedure					
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168				
	Lack of adherence to SOP for take-off procedure in terms of determining of aircraft	198				
	configuration.					
	Lack of adherence to SOP for take-off procedure in terms of checking take-off	201				
	configuration before application of take-off power.					
	Lack of adherence to ICAO Annex 14 SARPs in terms of RWY mainternance - presence of	216				
	contaminations.					
	Incorrect stab-trim setting	258				
	Inadequate certification process and / or flaws in methodology concerning verification	358				
	of the system / product compliance with requirements - Landing gear components					
	Slow rotation (i.e., low pitch rate)	371				
	Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence	401				
	integrity monitoring					
	Lack of adherence to SOP for take-off procedure in terms of speed bug checklist	419				
	preparation and verification.					
	Inadequate certification process and / or flaws in methodology concerning verification	420				
	of the system / product compliance with requirements - FCS system or components					
		1				1
	Flaws in manufacturer quality control process - FCS system components	421				
	Flaws in aircraft system maintenance process definition - FCS systems or components	422				
	Flaws in aircraft system maintenance process definition - Landing gear components.	377				
	Flaws in manufacturer quality control process - Landing gear components.	376				