

Process for Safety Performance Monitoring

A. Iwaniuk (IoA), P. Michalak (CAA PL), G. van Es (NLR), B. Dziugiel (IoA), W. Miksa (IoA), M. Mączka (IoA), N. Aghdassi (AVA), R. Menzel (JRC), L. Save (DBL)



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.

Coordinator	L.J.P. Speijker (NLR)
Work Package Manager	N. Aghdassi (Avanssa)

Grant Agreement No.	314299
Document Identification	D2.3
Status	Approved
Version	1.0
Date of Issue	21-03-2014
Classification	Restricted

This page is intentionally left blank

Ref: ASCOS_WP2_loA_D2.3
Issue: 1.0

Page: 3
Classification: Restricted

Document Change Log

Version	Author(s)	Date	Affected Sections	Description of Change
1.0	A. Iwaniuk et al.	21-03-2014	All	First approved version

Review and Approval of the Document

Organisation Responsible for Review	Name of person reviewing the document	Date
NLR	R. Wever, A.L.C. Roelen, J.G. Verstraeten	07-03-2014
CAAi	S. Long, T. Longhurst	07-03-2014
Deep Blue	L. Save	07-03-2014
JRC	W. Post	07-03-2014
Avanssa	N. Aghdassi	07-03-2014
Organisation Responsible for Approval	Name of person approving the document	Date
Avanssa	N. Aghdassi	21-03-2014

Document Distribution

Organisation	Names
European Commission	M. Kyriakopoulos
NLR	L. Speijker, A. Rutten, M.A. Piers, U. Dees, P. van der Geest, A. Roelen, J.J. Scholte, J.G. Verstraeten, A.D. Balk, E. van de Sluis
Thales Air Systems GmbH	G. Schichtel, J.-M. Kraus
Thales Air Systems SA	B. Pauly
Airbus Defence and Space APSYS	S. Bravo Muñoz, J.P. Heckmann, M. Feuvrier
Civil Aviation Authority UK	S. Long, A. Eaton, T. Longhurst
ISDEFE	M. Martin Sanchez, I. Etxebarria, M. Sánchez
CertiFlyer	G. Temme, M. Heiligers
Avanssa	N. Aghdassi
Ebeni	A. Simpson, J. Denness, S. Bull
Deep Blue	L. Save
JRC	W. Post, R. Menzel
JPM	J. P. Magny
TU Delft	R. Curran, H. Udluft, P.C. Roling
Institute of Aviation	K. Piwek, A. Iwaniuk
CAO	P. Michalak, R. Zielinski
EASA	K. Engelstad
FAA	J. Lapointe, T. Tessitore
SESAR JU	P. Mana
Eurocontrol	E. Perrin
CAA Netherlands	R. van de Boom
JARUS	R. van de Leijgraaf
SRC	J. Wilbrink, J. Nollet
ESASI	K. Conradi
Rockwell Collins	O. Bleeker, B. Biddenne
Dassault Aviation	B. Stoufflet, C. Champagne
ESA	T. Sgobba, M. Trujillo
EUROCAE	A. n'Diaye
TUV NORD Cert GmbH	H. Schorcht
FAST	R. den Hertog

Ref: ASCOS_WP2_IoA_D2.3

Page: 5

Issue: 1.0

Classification: Restricted

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
CAP	Corrective Action Plan
CATS	Causal Model for Air Transport Safety
CC	Compliance Checklist
CMA	Continuous Monitoring Approach
CMO	(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

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
MOU	Memorandum of Understanding
MRO	Maintenance, Repair and Operations
MS	Management System
NAA	National Aviation Authority
NCCMC	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 Incursions
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

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
COL	Collision with a vehicle, person or aircraft, while aircraft is on the ground.
CTOL	Collision with obstacle(s) during take-off and landing
DMAN	Departure Management
EVAC	Evacuation
EXTL	External load related occurrence
F-NI	Fire /smoke (non-impact)
F-POST	Fire /smoke (post-impact)
FUEL	Fuel related

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

Ref: ASCOS_WP2_IoA_D2.3

Page: 10

Issue: 1.0

Classification: Restricted

This page is intentionally left blank

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]

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.

Ref: ASCOS_WP2_IoA_D2.3

Page: 13

Issue: 1.0

Classification: Restricted

This page is intentionally left blank

Table of Contents

Document Change Log	3
Review and Approval of the Document	3
Document Distribution	Error! Bookmark not defined.
Acronyms	6
Executive Summary	11
List of Figures	17
List of Tables	18
1 Introduction	20
1.1 Task objective	20
1.2 Research approach	21
1.3 Structure of the document	21
1.4 Definitions	22
2 Process for safety performance monitoring	24
2.1 ASCOS Safety Assurance process	24
2.1.1 Performance-based requirements	25
2.1.2 A management system and ASCOS enhancement	27
2.1.3 Process organisation	29
2.2 Internal structure of the metaprocess of SPIs and precursors links identification	31
2.2.1 Safety Performance Indicators	31
2.2.2 Precursors	32
2.2.3 Application of the method for linking precursors to SPIs	33
2.3 An example of ASCOS enhanced Safety Assurance	34
2.4 Relationship with other components of the SMS framework	37
3 Safety Data Collection, Analysis and Exchange	38
3.1 Criteria for data quality	38
3.2 Evaluation of feasibility and implementation issues related to proposed processes of safety performance monitoring in ECCAIRS Reporting System	39
3.2.1 Feasibility of the proposed processes of safety performance monitoring	39
3.2.2 Implementation issues related to proposed processes of safety performance monitoring in ECCAIRS Reporting System	41

3.2.3	Mapping exposure data to data in occurrence reports	43
3.2.4	Process considerations	44
3.3	The use of data from the Flight Data Monitoring (FDM), Flight Operations Quality Assurance (FOQA) in continuous safety monitoring	44
3.3.1	Background	44
3.3.2	The Use of FDM today	45
3.3.3	Setting up a flight data database at a European aggregation level	46
3.3.4	Central collection of predefined FDM parameters/events	46
3.3.5	Central collection of raw flight data	47
3.3.6	Exposure data	48
3.3.7	Use of flight data for continuous safety monitoring	49
3.3.8	Integration of flight data with other data sources	50
3.3.9	Integration of flight data with ECCAIRS	51
3.3.10	Final remarks	51
3.4	The Automatic Safety Data Gathering in ATM as a source for continuous safety monitoring	52
3.4.1	Potential use of ASDG in the ASCOS Safety Performance Monitoring	54
3.5	Flight simulator data as input for continuous safety monitoring	56
3.6	Protection of safety data	57
3.7	Conclusions and recommendations on the safety data management	59
4	Safety performance monitoring process for system of organisations	61
4.1	Atypicality scores for SPIs aggregates at System of organisations level	61
5	Conclusions and recommendations	62
5.1	Conclusions	62
5.2	Recommendations	62
	References	64
Appendix A	The result: links between precursors and SPIs	67
Appendix B	Details of Step 1 to 8	69
Appendix C	The precursors and stakeholders of CMA	69
Appendix C.1	Precursors – occurrences and their stakeholders	69
Appendix C.2	Precursors – deviations and their stakeholders	72

Ref:	ASCOS_WP2_IoA_D2.3	Page:	16
Issue:	1.0	Classification:	Restricted

Appendix D	Safety Performance Indicators	85
Appendix E	ICAO USOAP Program and Continuous Monitoring Approach and EASA Standardisation	101
Appendix E.1	ICAO USOAP Program and Continuous Monitoring Approach	101
Appendix E.2	EASA Standardisation	107
Appendix F	Safety Database	123

Ref: ASCOS_WP2_IoA_D2.3
Issue: 1.0

Page: 17
Classification: Restricted

List of Figures

Figure 1 Safety Assurance using SPIs and precursors _____	32
Figure 2 Safety performance monitoring, one SPI example _____	34
Figure 3 Example of routine event data (source: NLR) _____	45
Figure 4 Illustration of approach one for flight data collection _____	48
Figure 5 Illustration of approach two for flight data collection _____	48
Figure 6 Example pilot reaction time distribution to TAWS alert (source: Honeywell) _____	49
Figure 7 Example of STCA events plotted on an X-Y map to identify STCA hot spots (source: Pozzi et al. 2011) _____	53
Figure 8 Example of Severity Marksheet from the Risk Analysis Tool (EUROCONTROL 2009) _____	55
Figure 9 Human level SPIs (source: ASCOS D2.1, p.48, _____	57

Ref: ASCOS_WP2_IoA_D2.3
Issue: 1.0

Page: 18
Classification: Restricted

List of Tables

Table 1 The generalised example of practical use of the ASCOS SPIs and precursors _____	35
Table 2 An example of SPI7 associated precursors list and the post investigation “real” precursors _____	36

Ref: ASCOS_WP2_IoA_D2.3

Page: 19

Issue: 1.0

Classification: Restricted

This page is intentionally left blank

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 measurable 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?

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.

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]

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.

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).

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]:

1. 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.

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.

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;

- 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)

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.

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.

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

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.

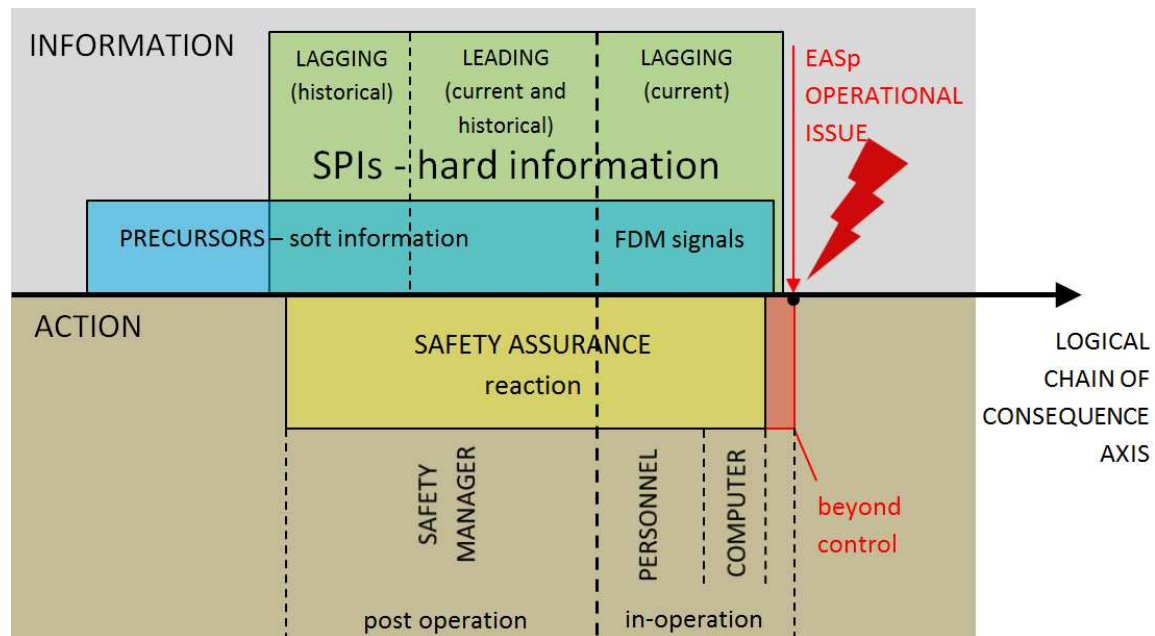


Figure 1 Safety Assurance using SPIs and precursors

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:

- 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).

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.

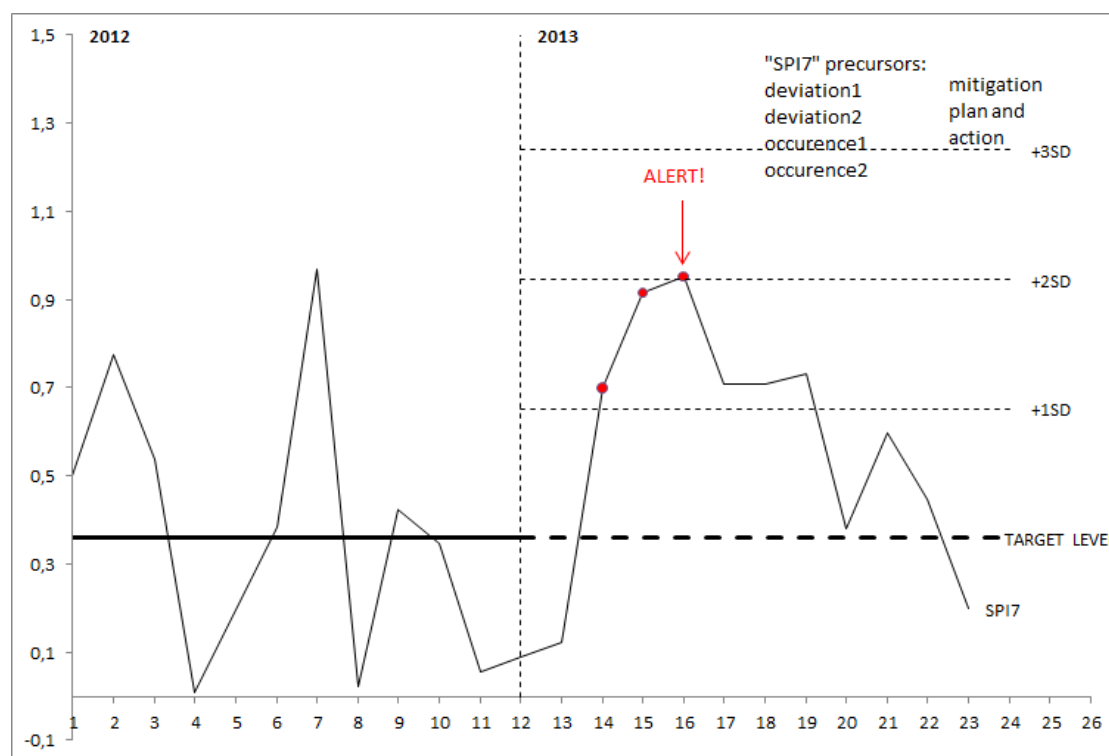


Figure 2 Safety performance monitoring, one SPI example
(X-axis: periods=months since implementation of MS,
Y-axis: SPI7 rate in 1000s monthly aggregated at a service provider level)

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

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

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 gear system failures/flight	ASCOS model precursors – uneventful events (occurrences)	Post investigation “real” precursors
	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)	...

SPI7: Rate of landing	ASCOS model precursors –	Post investigation “real”
-----------------------	--------------------------	---------------------------

gear system failures/flight	deviations	deviations
	Flaws in maintenance technician / airworthiness specialist / requirements definition process and/or training methodology	No
Maintenance technician / airworthiness specialist - Inadequate workload distribution	No	
Pilot tiredness - Inadequate workload distribution		Fleet Roster Officer: Yes, flying personnel is exhausted. We have not enough crew to 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;

- 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.

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

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 be 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.

- 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 nav aids 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.

- 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 measures aimed at improving the quality of the reported data are also being considered.

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 *are complete and of high quality*” [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.

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. Its 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.

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.

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.

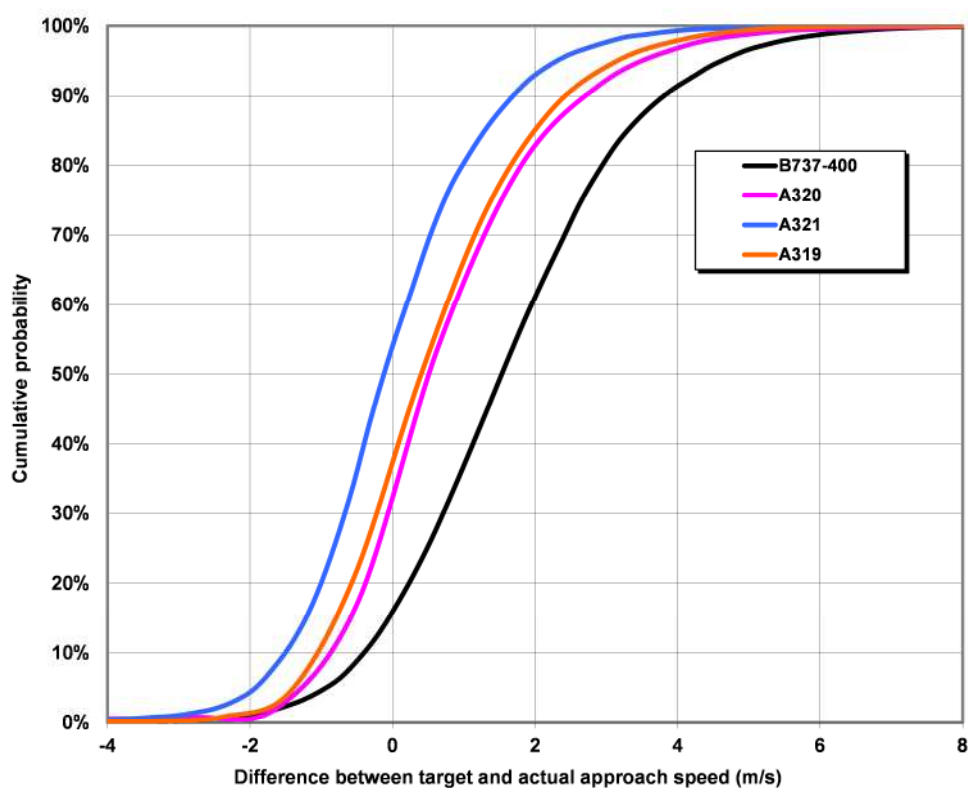


Figure 3 Example of routine event data (source: NLR)

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

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

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.

Approach one

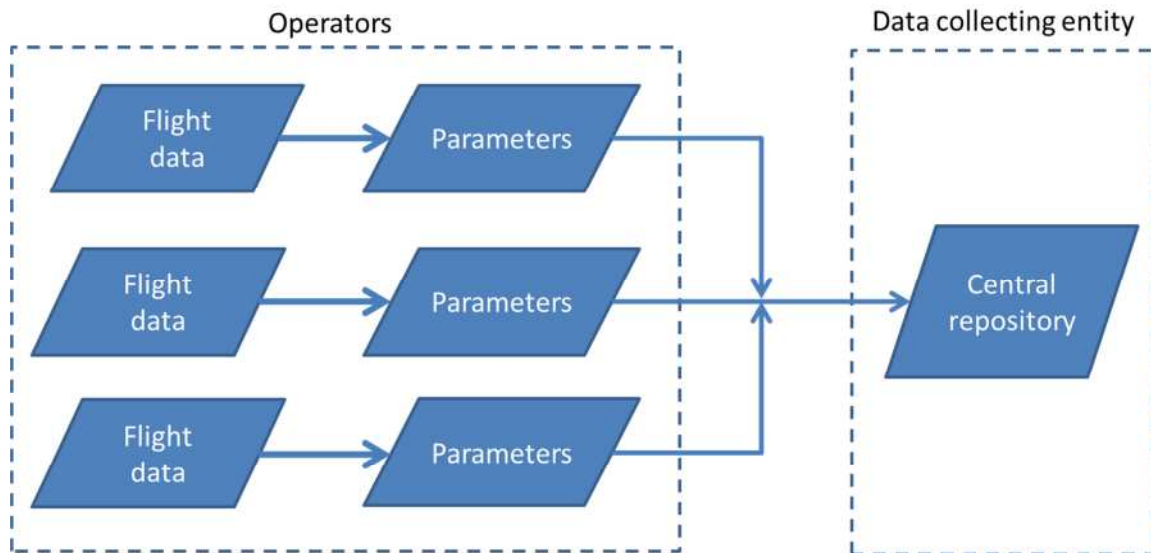


Figure 4 Illustration of approach one for flight data collection

Approach two

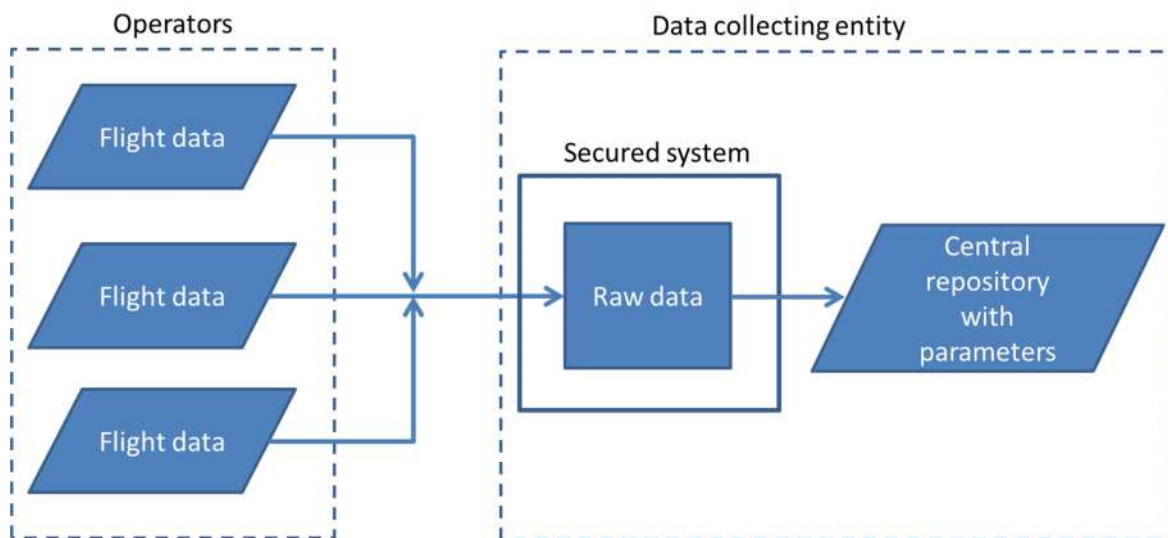


Figure 5 Illustration of approach two for flight data collection

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

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.

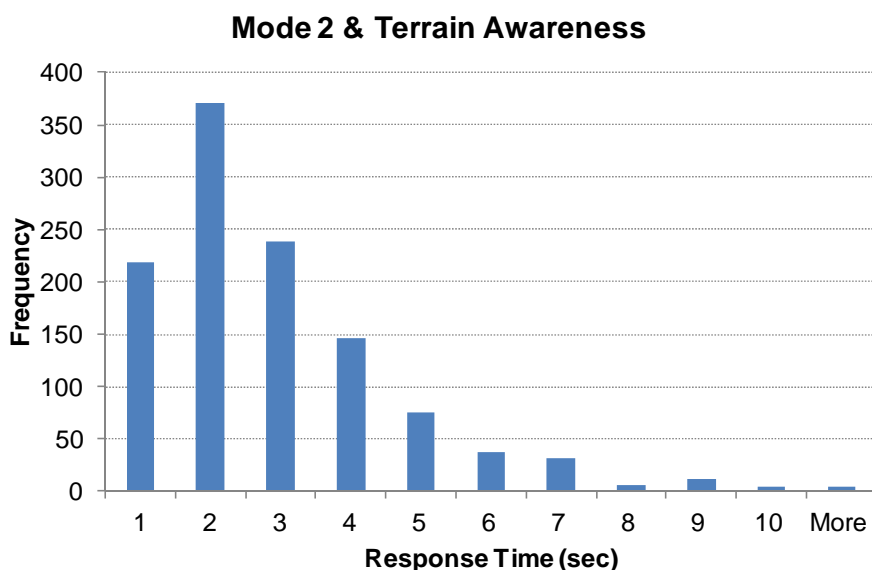


Figure 6 Example pilot reaction time distribution to TAWS alert (source: Honeywell)

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.

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.

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).

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).

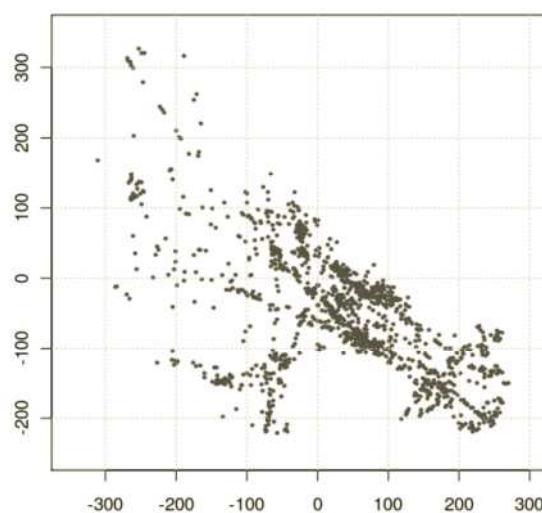


Figure 7 Example of STCA events plotted on an X-Y map to identify STCA hot spots (source: Pozzi et al. 2011)

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

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.

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.

A. SEVERITY					
1. Risk of collision	ATM ground		ATM airborne		ATM overall
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		
Total separation (a)					0
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)					0
TOTAL (1-ATM) Risk of Collision (a)+(b)					0
TOTAL (1-ATM Ground) Risk of Collision (a)+(b)					0

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.

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)

EASp Operational Issue	Safety Occurrence	Possible associated human errors	Impacted Accident Scenario Event	Possible automatic detection tool
Ground Collision	Runway Incursion	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • RIMCAS log files
	Taxiway Incursion	<ul style="list-style-type: none"> • Erroneous taxi clearance issued by ATCO • Taxi clearance erroneously executed by FC • Call-sign confusion • Incorrect phraseology • Incorrect pilot readback 	ASC36a1	<ul style="list-style-type: none"> • Currently not available
Loss of Control in Flight	Stall Warning	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Stall Warning System log files • EGPWS or TAWS Stall Warning log files
	Bank Angle alert	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Flight Data Monitoring (FDM) • E-GPWS or TAWS Bank Angle alert (Mode 6) log files
Controlled Flight Into	Near CFIT	<ul style="list-style-type: none"> • Altitude component of clearance/avoiding action erroneously executed by FC 	ASC35a1 ASC35a11 ASC35a12	<ul style="list-style-type: none"> • 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].

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.

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.

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.

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:

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

Where:

\mathbf{X} – n x k matrix of n SPIs aggregated per period in organisation k

$\boldsymbol{\mu}$ – n x 1 vector of e.g. means for SPIs

\mathbf{S} – n x n covariance matrix of the (X- $\boldsymbol{\mu}$) matrix

The atypicality distance values are found in the resulting $D_M(\mathbf{X})$ (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.

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;

- 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.

References

#	Authors(s), Title, Year
[1]	ICAO. Annex 13 to the Convention on International Civil Aviation: Aircraft Accident and Incident Investigation; July 2010
[2]	ICAO. Annex 19 to the Convention on International Civil Aviation: Safety Management, First Edition, July, 2013
[3]	ICAO. Doc 8643 - Aircraft Type Designators
[4]	ICAO. Doc 9734. Safety Oversight Manual, Part A, The Establishment and Management of a State's Safety Oversight System; Second Edition — 2006
[5]	ICAO. Doc 9735. USOAP. Universal Safety Oversight Audit Programme Continuous Monitoring Manual, Third Edition — 2011
[6]	ICAO. Doc 9859. Safety Management Manual (SMM); Third Edition — 2013
[7]	ICAO. GLOBAL AVIATION SAFETY PLAN, 2013
[8]	ICAO. CAST. http://www.intlaviationstandards.org/MakeModelSeries.html - CAST/ICAO Common Taxonomy
[9]	ICAO. USOAP CMA on SSP – Rollout Continuous Monitoring and Oversight (CMO), Air Navigation Bureau, 3 July 2013.
[10]	ICAO, https://soa.icao.int/usoap/ - The USOAP website
[11]	ICAO. Memorandum of Cooperation between the European Union (EU) and the International Civil Aviation Organization (ICAO) providing a framework for enhanced cooperation, 2010
[12]	ICAO. The USOAP Evolved. Realizing the Promise of the Continuous Monitoring Approach, ICAO Journal – Issue 05 – 2010.
[13]	ISO EN 9100 rev. C, 2009 - Aerospace industry standards
[14]	EU. COMMISSION IMPLEMENTING REGULATION (EU) No 390/2013 of 3 May 2013 laying down a performance scheme for air navigation services and network functions
[15]	EU. COMMISSION IMPLEMENTING REGULATION (EU) No 628/2013 of 28 June 2013 on 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 and of the Council and repealing Commission Regulation (EC) No 736/2006
[16]	EU. COMMISSION IMPLEMENTING REGULATION (EU) No 90/2012 of 2 February 2012 amending Regulation (EC) No 736/2006 on working methods of the European Aviation Safety Agency for conducting standardisation inspections
[17]	EU. COMMISSION IMPLEMENTING REGULATION (EU) No 923/2012 of 26 September 2012 laying down the common rules of the air and operational provisions regarding services and procedures in air navigation and amending Implementing Regulation (EU) No 1035/2011 and Regulations (EC) No 1265/2007, (EC) No 1794/2006, (EC) No 730/2006, (EC) No 1033/2006 and (EU) No 255/2010
[18]	EU. COMMISSION REGULATION (EU) No 290/2012 of 30 March 2012 amending Regulation (EU) No 1178/2011 laying down technical requirements and administrative procedures related to civil aviation aircrew pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council
[19]	EU. COMMISSION REGULATION (EU) No 965/2012 of 5 October 2012 laying down technical requirements and administrative procedures related to air operations pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council
[20]	EU. COMMISSION REGULATION (EC) No 1321/2007 of 12 November 2007 laying down implementing rules for the integration into a central repository of information on civil aviation occurrences exchanged in accordance with Directive 2003/42/EC of the European Parliament and of the Council

[21]	EU. COMMISSION REGULATION (EC) No 1330/2007 of 24 September 2007 laying down implementing rules for the dissemination to interested parties of information on civil aviation occurrences referred to in Article 7(2) of Directive 2003/42/EC of the European Parliament and of the Council
[22]	EU. ECCAIRS. http://eccairsportal.jrc.ec.europa.eu/ - ECCAIRS portal website
[23]	EU. REGULATION (EU) No 996/2010 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 20 October 2010 on the investigation and prevention of accidents and incidents in civil aviation and repealing Directive 94/56/EC
[24]	EU. REGULATION (EC) No 216/2008 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 20 February 2008 on common rules in the field of civil aviation and establishing a European Aviation Safety Agency, and repealing Council Directive 91/670/EEC, Regulation (EC) No 1592/2002 and Directive 2004/36/EC
[25]	EU.COMMISSION IMPLEMENTING REGULATION (EU) No 1034/2011 of 17 October 2011 on safety oversight in air traffic management and air navigation services and amending Regulation (EU) No 691/2010
[26]	EU.COMMISSION IMPLEMENTING REGULATION (EU) No 1035/2011 of 17 October 2011 laying down common requirements for the provision of air navigation services and amending Regulations (EC) No 482/2008 and (EU) No 691/2010
[27]	EASA. ECAST. https://www.easa.europa.eu/essi/ecast/main-page-2/sms/ - Safety Management and Safety Culture, European Commercial Aviation Safety Team (ECAST)
[28]	EASA. European Aviation Safety Agency Report European Aviation Safety Plan 2012-2015, Final, TE.GEN.00400-002
[29]	EASA. European Aviation Safety Plan 2011-2014, 2011.
[30]	EASA. European Aviation Safety Plan 2013-2016; Final, TE.GEN.00400-002
[31]	EASA. http://easa.europa.eu/essi/ehest/main-page/ehest-safety-management-toolkit/ - European Helicopter Safety Team (EHST) Safety Management Toolkit for non-Complex Operators consisting of a Safety Management Manual (SMM), a Guidance Document and an Emergency Response Plan
[32]	European Authorities coordination group on Flight Data Monitoring (EAFDM), Guidance for National Aviation Authorities Setting up a national Flight Data Monitoring forum, 10 October 2012, version 1
[33]	European Aviation Research Partnership Group; EARPG Thematic Programme 2011-2013, 29 March 2011.
[34]	SMICG. Measuring Safety Performance Guidelines for Service Providers, Safety Management International Collaboration Group (SM ICG), July, 2013
[35]	SMICG. Risk Based Decision Making Principles, Safety Management International Collaboration Group (SM ICG), January 2013
[36]	EUROCONTROL. Guidance Material for Automatic Safety Data Gathering, EUROCONTROL 2004
[37]	EUROCONTROL. http://www.eurocontrol.int/articles/eurocontrol-generic-safety-management-manual - Eurocontrol Generic Safety Management Manual (EGSMM)
[38]	EUROCONTROL. Performance Review Report, EUROCONTROL 2010
[39]	EUROCONTROL. Risk Analysis Tool – Guidance Material, Edition 1, European Organisation for the Safety of Air Navigation (EUROCONTROL), Brussels, 2009
[40]	SESAR. http://www.sesarju.eu/programme/workpackages/wp-16-rd-transversal-areas--203 - Single European Sky ATM Research (SESAR), WP16 - Safety Management and Safety Assessment
[41]	CATS Final Report, Dutch Ministry of Transport, March 2009
[42]	UK CAA, CAP 739. Flight Data Monitoring. A Guide to Good Practice; Civil Aviation Authority 2003
[43]	ASCOS. A.L.C. Roelen (NLR) , J. Verstraeten (NLR) , L. Save (Deep Blue) , N. Aghdassi (Avanssa); Framework Safety Performance Indicators, ASCOS D2.1, 2013

[44]	ASCOS. A.L.C. Roelen (NLR), J.G. Verstraeten (NLR), V. Bonvino (APSYS), J.-F. Delaigue (APSYS), J.-P. Heckmann (APSYS), T. Longhurst (CAAi) , L. Save (Deep Blue); Risk models and accident scenarios, ASCOS D3.2, 2013
[45]	ASCOS. Causal Model for Air Transport Safety (CATS) V0.1 Event Sequence Diagrams (ESDs) for ASCOS (MS Excel file)
[46]	ASCOS. J.P. Magny (JPM), A.L.C. Roelen (NLR), J.J. Scholte (NLR), T. Longhurst (CAAi), A. Iwaniuk (IoA); Total aviation system safety assessment methodology, ASCOS D3.1, 2013
[47]	ARTICLE. Guzzetti, J., The Agony and the Ecstasy of Utilizing Safety Data for Modern Accident Prevention and Investigation, FAA, at: International Society of Air Safety Investigators, ISASI Seminar in Vancouver, Canada, 2013
[48]	ARTICLE. M. Tremaud, Identifying and Using Precursors – A gateway to gate-to-gate safety enhancement, 22nd EASS March 2010
[49]	ARTICLE. Pozzi et al., Safety Monitoring in the Age of Big Data. From Description to Intervention, at: Ninth USA/Europe Air Traffic Management Research and Development Seminar, ATM2011
[50]	ARTICLE. Pozzi et al., Turning information into knowledge. The case of Automatic Safety Data Gathering, at: EUROCONTROL Annual Safety R&D Seminar, Southampton, UK, 2008
[51]	EU. REGULATION (EC) No 1108/2009 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 21 October 2009 amending Regulation (EC) No 216/2008 in the field of aerodromes, air traffic management and air navigation services and repealing Directive 2006/23/EC
[52]	EASA. http://easa.europa.eu/approvals-and-standardisation/approvals-and-standardisation-directorate.php
[53]	EU. INTERNATIONAL AGREEMENTS, COUNCIL DECISION of 31 March 2011 on the signing, on behalf of the Union, and provisional application of a Memorandum of Cooperation between the European Union and the International Civil Aviation Organization providing a framework for enhanced cooperation
[54]	FAA. Report No DOT-VNTSC-FAA-12-13, Biernbaum, L., Hagemann, G., Runway Incursion Severity Risk Analysis, FINAL Report, Runway Safety Office of Safety ATO, FAA, Washington, D.C., 2012
[55]	EU. DIRECTIVE 2003/42/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 13 June 2003 on occurrence reporting in civil aviation
[56]	ARTICLE. Roelen, A.,L.,C., Causal risk models of air transport, Comparison of user needs and model capabilities, IOS Press, 2008
[57]	NASA. Statler, I., C. [editor], The Aviation System Monitoring and Modeling (ASMM), Project: A Documentation of its History and Accomplishments: 1999–2005, NASA/TP–2007-214556, June 2007.
[58]	EASA. GUIDANCE ON HAZARDS IDENTIFICATION, Safety Management System and Safety Culture Working Group (SMS WG), March 2009.

Appendix A The result: links between precursors and SPIs

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

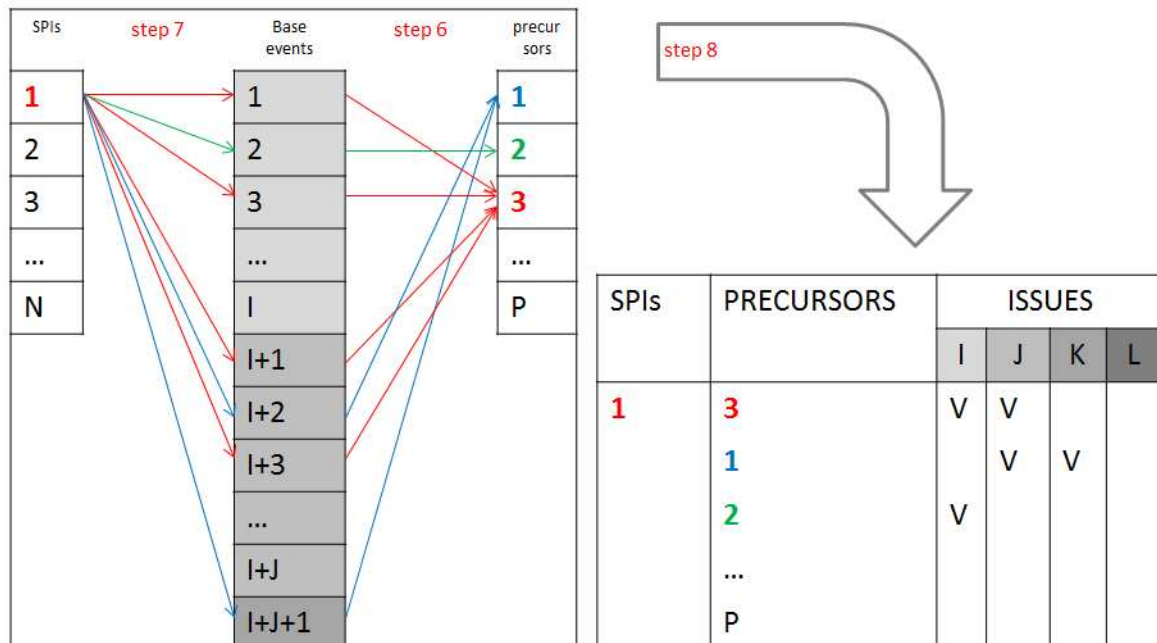
Brief explanation below, only.

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.

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

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.

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):

	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		V		V	V	

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 430 (You find the source precursor at this page.)

7	ER13F41	System failure affecting the operation of primary instruments / displays or standby instruments	26	13; 3;	13; 14; 15; 16; 18; 19; 21; 22;	26; 31; 35; 38; 41; 42;	47; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
---	---------	---	----	--------	---------------------------------	-------------------------	--

2) MAC (=ESD 31)

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

ESD 31	Code	Identifiable precursors	No.	Technology	Human	Organisation	System of Organisations

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

46	ER31B33	Traffic controller tiredness - Inadequate workload distribution	137	13; 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.)

ESD 1	Code	Identifiable precursors	No.	Technology	Human	Organisation	System of Organisations
1	TO01B11	System failure affecting the operation of primary instruments / displays or standby instruments	26	13; 9;	13; 18; 21; 22;	31; 41;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63

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
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	V	
Volcanic ash encounter	22		V	V	
Mountain wave / vortices encounter	23		V	V	
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

Ref: ASCOS_WP2_loA_D2.3
Issue: 1.0

Page: 70
Classification: Restricted

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		V	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	
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	
Low altitude pattern following a go-around	56		V	V	
Inappropriate low altitude maneuvering	57			V	
Low-on-fuel condition / fuel starvation	58			V	
Crew incapacitation resulted from illness (e.g. food poisoning)	59			V	
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	

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 occurrences appeared during take-off roll	85		V	V	
Line-up events	93	V	V	V	V
Aircraft swerve / lateral excursion during takeoff roll	96			V	
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				V
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 communication.	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	

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			V	
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 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 / clearance	143			V	
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	

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 requirements - Ground Radar	165		V		V
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 methodology	168			V	
Hearback omitted	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	
Lack of adherence to emergency procedures - WEM	173			V	
Late activation of pedal braking or takeover from autobrake, when so required	174			V	
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 requirements - Compressor in the engine	186				V
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 accessory drive components.	190	V			
Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine accessory drive components.	191				V
Incorrect use of automation - TOCW System	192			V	
Go-around attempt after thrust reversers deployment	193			V	

Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ECAM (or similar) system components.	194			V	
Flaws in aircraft system maintenance process definition - ECAM (or similar) system components.	195	V			
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		V	V	
Lack of adherence to SOP in terms of awareness on supporting systems warning - stickshaker	197			V	
Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.	198			V	
Poor application of T/O & RTO procedure, braking initiation sequence	199			V	
Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling	200			V	
Lack of adherence to SOP for take-off procedure in terms of checking 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 surface friction rate below minimum	203		V	V	
Flaws in aircraft system maintenance process definition - TOCW System	204	V			
Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - RCWS	205				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, aircraft de-icing	208			V	
Poor application of T/O & RTO procedure, failure recognition and preparedness	209			V	
Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.	210			V	
High energy RTO rate is an indicator of improper Operator's policy for T/O operations.	211			V	
Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT)	212			V	
Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - antiice fluid HOT	213			V	
Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared	214			V	
Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System.	215	V			
Lack of adherence to ICAO Annex 14 SARPs in terms of RWY 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 safety supporting systems. Lack of fire detection / warning or / and extinguishing system.	220	V			
Inadequate effectiveness of fire extinguishing system	221				V

Flaws in manufacturer quality control process - TOCW system 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			V	
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		V	V	
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 conditions	228			V	
Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System	229				V
Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components	230				V
Lack of adherence to SOP in terms of aircraft icing (condition) monitoring	231			V	
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 in terms of protecting of critical aircraft systems against contamination	233			V	
Lack of adherence to SOP in terms of requested information support for other aircraft in terms of adverse weather conditions	234			V	
Lack of adherence to SARPs in terms of avoiding adverse weather conditions during flight	235			V	
Incorrect weather report obtained by the flight crew	236		V		
Lack of adherence to SOP in terms of providing flight crew with current weather report	237			V	
Flaws in manufacturer quality control process - Power supply system components	238				V
Lack of adherence to SOP in terms of application of findings from weather report	239		V	V	
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 warning	244			V	
Lack of adherence to SOP in terms of approach and landing	245			V	
Lack of adherence to SOP in terms of briefing and checklist before 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 adverse weather.	249			V	
Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure	250			V	
Lack of adherence to AFM limitations for landing	251			V	

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 requirements - PWS system	253				V
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 verification	255			V	
Lack of adherence to the current technology standards in terms of flight safety and efficiency - fuel tank allocation.	256	V			
Lack of adherence to SOP in terms of AFM limitations in terms of weigh and balance	257			V	
Incorrect stab-trim setting	258			V	
Undetected incorrect takeoff configuration	259			V	
Poor application of T/O & RTO procedure, computation of T/O parameters	260			V	
Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment	261				V
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 components	266				V
Difference indications of independent aircraft speed / altitude or attitude indicators	267				V
Flaws in aircraft system maintenance process definition - Braking system related components	268	V			
Incorrect use of automation - FMS	269			V	
Flaws in aircraft system maintenance process definition - Communication equipment systems and components.	270	V			
Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.	271				V
Flaws in manufacturer quality control process - Communication equipment systems and components.	272				V
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 requirements - Rudder components.	276				V
Flaws in aircraft system maintenance process definition - Rudder components.	277	V			
Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain)	278		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 requirements - Horizontal stabilizer components.	280				V
Premature descent to DA(H) before G/S intercept or premature descent to MDA(H) before final-descent-point / FAF	281			V	
Premature descent below MDA(H) before reaching the visual-descent-point (VDP)	282			V	
Flight below desired flight path during initial and/or final approach	283			V	

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 requirements - Components of Wing control surface system.	288				V
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 requirements - ACAS system components	290				V
Failure to follow published missed-approach procedure	291			V	
Lack of adherence to AFM in terms of emergency procedures - stall recovery	292			V	
Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS	293	V			
Lack of adherence to SOP for take-off procedure in terms of altimeter 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 and obstacles locations.	295			V	
Lack of adherence to Rules of the Air - adherence to Controller clearance	296			V	
Lack of adherence to TO procedure in terms of anti-ice 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 requirements - FMS subsystems and components (autopilot incl.)	299				V
Tactical or / and Planning Controller tiredness - Inadequate workload distribution	300		V		
Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology	301		V		
Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of MSAW system.	302	V			
Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. Navigational aid failure.	303		V	V	
Imbalanced and inappropriate relation between cpt and his subordinates	304			V	
Unintuitive and / or error prone system manual - communication equipment.	305				V
Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)	306				V
Lack of adherence to SOP for AIR operations in terms of controller error in approach clearance instruction	307		V		
Not recognized ground NavAids System failure not reflected in NOTAM messages	308		V		
Lack of adherence to SOP in terms of pre-flight inspections - ice presence on aircraft	309			V	
Flaws in manufacturer quality control process - anti-ice fluid specifications (HOT)	310				V
Flaws in aircraft system maintenance process definition - Components of Wing control surface system.	311	V			
Altitude deviation	312			V	
Level bust (pilot lapse or late re-clearance by ATC)	313		V	V	

Ref: ASCOS_WP2_IoA_D2.3
Issue: 1.0

Page: 78
Classification: Restricted

Flaws in manufacturer quality control process - Components of Wing control surface system.	314				V
Failure to comply with an altitude or speed restriction / constraint	315			V	
Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine	316				V
Navigation deviation	317			V	
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 requirements - ADI system components	320				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 the engine.	324				V
Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.	325		V		
Flaws in conflict and separation minima infringement detection / elimination procedures	326		V		
Lack of adherence of airlines to time constraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data.	327			V	
Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MTC System	328				V
Lack of adherence of airlines to declared Flight Plan.	329			V	
Failure to identify the pre-tactical conflict before it reach the tactical controller	330		V		
Lack of adherence to SOP for Airborne operation in terms of minimum separation	331		V		
Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Thrust reverse system in the engine.	332				V
Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components	333				V
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 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	340		V		
Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Integrity of primary aircraft structure.	341				V
Intensified traffic related to general aviation activity e. g. over GA airport / airfield	342		V		
Deviation from flight trajectory commanded by controller	343		V		

Lack of adherence to the current technology standards in terms of flight 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 aircraft structure.	348				V
Late or inadequate response to ACAS warning	349			V	
Lack of adherence to emergency procedures - flight deck smoke procedure	350			V	
Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - STCA System	351				V
Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fuel system components	352				V
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 requirements in terms of fire resistance	354				V
Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.	355	V			
Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - LLWAS system	356				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 requirements - Landing gear components	358				V
Lack of adherence to regulations concerning transport of DGR goods	359			V	
Separation of structural element / component of the aircraft during take-off or landing	360	V			
Flaws in aircraft system maintenance process definition - Fuel system components	361	V			
Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Reduction gear in the engine	362				V
Flaws in manufacturer quality control process - Reduction gear in the engine.	363				V
Flaws in aircraft system maintenance process definition - Reduction gear in the engine.	364	V			
Flaws in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake).	365				V
Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake).	366	V			
Taxiing without clearance	367			V	
Late rejected takeoff decision / initiation	368			V	
Flaws in manufacturer quality control process - ECAM (or similar) system components.	369				V
Lack of adherence to emergency procedures - Fuel starvation	370			V	
Slow rotation (i.e., low pitch rate)	371			V	

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	

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 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 limitation for take-off preparation.	404			V	
Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Pitot static system components	405				V
Flaws in manufacturer quality control process - Pitot static system components	406				V
Flaws in aircraft system maintenance process definition - Pitot static systems components	407	V			
Inadequate airline / regulatory provider policy in terms of aware of the risks related to air travel	408			V	
Lack of adherence to engine limitations	409			V	
Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)	410	V			
Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MSAW System	411				V
Descent above desired descent profile	412			V	
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			V	
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 checklist preparation and verification.	419			V	
Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FCS system or components	420				V
Flaws in manufacturer quality control process - FCS system components	421				V
Flaws in aircraft system maintenance process definition - FCS systems or components	422	V			
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				V
Flaws in manufacturer quality control process - Engine anti-ice system and / or components	424				V
Inadequate crosswind landing / decrab technique	425			V	
Long / floating flare	426			V	
Touchdown off centerline	427			V	
Flaws in aircraft system maintenance process definition - Engine anti-ice system and / or components	428				V
Lack of adherence to AFM in terms of emergency procedures - engine restart procedure	429			V	
Inappropriate use of differential reverse thrust	430			V	

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 requirements - ADI	435				V
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 failure	438			V	
Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ASI	439				V
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 requirements - PFD	442				V
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 requirements - On-board weather radar	445				V
Flaws in manufacturer quality control process - On-board weather radar	446				V
Flaws in aircraft system maintenance process definition - On-board weather radar	447	V			
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 requirements - Engine fuel distribution system	449				V
Flaws in manufacturer quality control process - Engine fuel distribution system	450				V
Flaws in aircraft system maintenance process definition - Engine fuel distribution system	451	V			
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 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 requirements - Oil distribution system	456				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 requirements - Engine combustor	460				V
Flaws in manufacturer quality control process - Engine combustor	461				V

Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine sensors	462				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 requirements - APU systems and / or components	464				V
Flaws in manufacturer quality control process - APU systems and / or components	465				V
Flaws in aircraft system maintenance process definition - APU systems and / or components	466	V			
Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Electrical / wiring system components	467				V
Flaws in manufacturer quality control process - Electrical / wiring systems components	468				V
Flaws in aircraft system maintenance process definition - Engine turbine components	470	V			
Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine turbine components	471				V
Flaws in manufacturer quality control process - Engine turbine components	472				V
Flaws in aircraft system maintenance process definition - Fire detection system components	474	V			
Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components	475				V
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 requirements - Fire warning system	478				V
Flaws in manufacturer quality control process - Fire warning system	479				V
Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components	480				V
Flaws in aircraft system maintenance process definition - Fire extinguishing system components	481	V			
Flaws in manufacturer quality control process - Fire extinguishing system components	482				V
Lack of adherence to AFM in terms of emergency procedures - fire detection and extinguishing procedure	483			V	
Unintuitive and / or error prone system manual - fire extinguishing system	484				V
Flaws in aircraft system maintenance process definition - GPWS system components	485	V			
Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - GPWS system components	486				V
Flaws in manufacturer quality control process - GPWS system components	487				V
Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS)	488	V			

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 immediate 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

Appendix D Safety Performance Indicators

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	1	Rate of autoflight system failures/flight	Appendix to ANNEX I
			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 power system failures/flight	Appendix to ANNEX I
			4. Electrical system
			(a) loss of one electrical distribution system (AC/DC)
			(b) total loss or loss of more than one electrical generation system
Technology	3	Rate of flight control system failures/flight	Appendix to ANNEX I
			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 failures/flight	ANNEX I
			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

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 power system failure/flight	ANNEX I
			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.).
			(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 protection system failures/flight	Appendix to ANNEX I
			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
			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

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
			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.
Technology	8	Rate of navigation system failures/flight	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 coding error
			(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
			transitions from inertial navigation mode to radio navigation mode.
Technology	9	Rate of powerplant system failures/flight	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.

List of Safety Performance Indicators	<p align="center">DIRECTIVE 2003/42/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 13 June 2003 on occurrence reporting in civil aviation</p>
	(b) Overspeed or inability to control the speed of any high-speed rotating 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 resulting 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 (LOTIC):
	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. for a multi-engine aircraft where the same, or similar, engine type is used in an application where the
	event would be considered hazardous or critical.
	(e) Any defect in a life-controlled part causing its withdrawal before completion of its full life.
	(f) Defects of common origin which could cause an in-flight shut-down rate so high that there is the possibility
	of more than one engine being shut down on the same flight.
	(g) An engine limiter or control device failing to operate when required or operating inadvertently.
	(h) Exceedance of engine parameters.
	(i) FOD resulting in damage.
	Propellers and transmission

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
			(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.
			(l) 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-icing facilities failure/flight	ANNEX I D. AIR NAVIGATION SERVICES, FACILITIES AND GROUND SERVICES (ii) Aerodrome and aerodrome facilities
Human	11	Rate of runway incursions/flight	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

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
			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 incursions/flight	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.
			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 warnings/flight	ANNEX I
			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 alerts/flight	ANNEX I
			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

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
		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 glideslope/approach	ANNEX I
			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 localizer/approach	ANNEX I
			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 low altitude/flight	ANNEX I
			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

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
			reference.
Human	19	Rate of separation minima infringements (ROC>7)/flight	ANNEX I A. AIRCRAFT FLIGHT OPERATIONS (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 infringements/flight	ANNEX II (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 busts/flight	ANNEX I 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 rejected take-off/attempted take-off	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. (f) Occurrences close to or above V 1 resulting from or producing a hazardous or potentially hazardous situation (e.g. rejected take-off, tail strike, engine-power loss etc.).
Human	23	Rate of continued approach (go around)	ANNEX II (c) aircraft deviation from ATC clearance;

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
		not conducted) following unstabilised approach/approach	(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	24	Rate of long landings/landing	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.
Human	25	Rate of excessive approach speed event/approach	ANNEX I B. AIRCRAFT TECHNICAL (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 approaches/landing	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.
Organisation	27	Rate of deep landings/landing	ANNEX I A. AIRCRAFT FLIGHT OPERATIONS (i) Operation of the aircraft

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
			(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 failure to deploy ground spoilers/landing	ANNEX I
			B. AIRCRAFT TECHNICAL
			(ii) Systems
			(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 application/landing	Appendix to ANNEX I
			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 application of thrust reversers/landing	Appendix to ANNEX I
			7. Flight controls
			(b) limitation of movement, stiffness or poor or delayed response in the operation of primary flight control systems
Organisation	31	Rate of level-busts/flight	ANNEX I
			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 errors which result in a loss of separation with another aircraft/flight	ANNEX II
			(i) Near collision incidents (encompassing specific situations where one aircraft and another aircraft/the
			(a) separation minima infringement;
Organisation	33	Rate of incorrect flight crew response to genuine TCAS RA warnings/warning	ANNEX I
			A. AIRCRAFT FLIGHT OPERATIONS
			(i) Operation of the aircraft
			(t) Inadvertent and/or incorrect operation of any controls.
Organisation	34	Rate of loss of	ANNEX II

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
		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 warnings/flight	ANNEX II
			(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 events/flight	ANNEX I
			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 crew response to genuine EGPWS warnings/warning	ANNEX I
			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	38	Rate of navigational errors which result in a loss of separation with terrain/flight	ANNEX II
			(i) Near collision incidents (encompassing specific situations where one aircraft and another aircraft/the
			(a) separation minima infringement;
Organisation	39	Rate of MSAW warnings/flight	ANNEX I
			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 automation events/flight	ANNEX I
			A. AIRCRAFT FLIGHT OPERATIONS
			(i) Operation of the aircraft
			(t) Inadvertent and/or incorrect operation of any controls.
Organisation	41	Rate of near-stall events/flight	ANNEX I
			A. AIRCRAFT FLIGHT OPERATIONS
			(i) Operation of the aircraft

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
			(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 angle events/flight	ANNEX I 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 incursion events/flight	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. 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 movement errors/flight	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	45	System combined runway incursion rate	ANNEX I

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
			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

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

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	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

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	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

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).

2. **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.

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]:

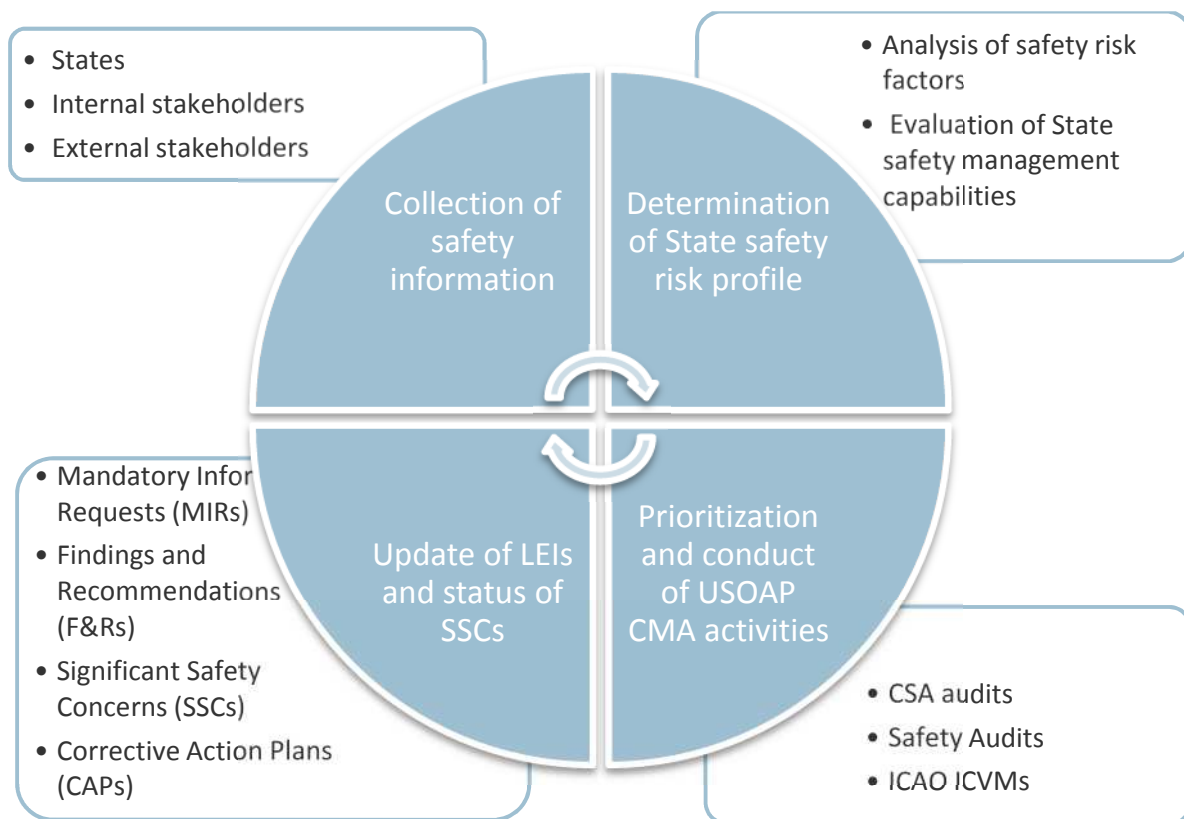
- a) collection of safety information;
- b) determination of State safety risk profile;
- c) prioritization and conduct of USOAP CMA activities; and
- d) update of the Lack of Effective Implementation (LEI) and the status of Significant Safety Concerns (SSCs).

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.



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

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,

- 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.

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: <ol style="list-style-type: none"> 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: <ol style="list-style-type: none"> 1. Flight Crew Licencing (FCL) 2. Operation of Aircraft (OPS) 3. Safety of foreign operators
Regulation (EC) No 1108/2009 [51]	Second extension: <ol style="list-style-type: none"> 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.

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

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.

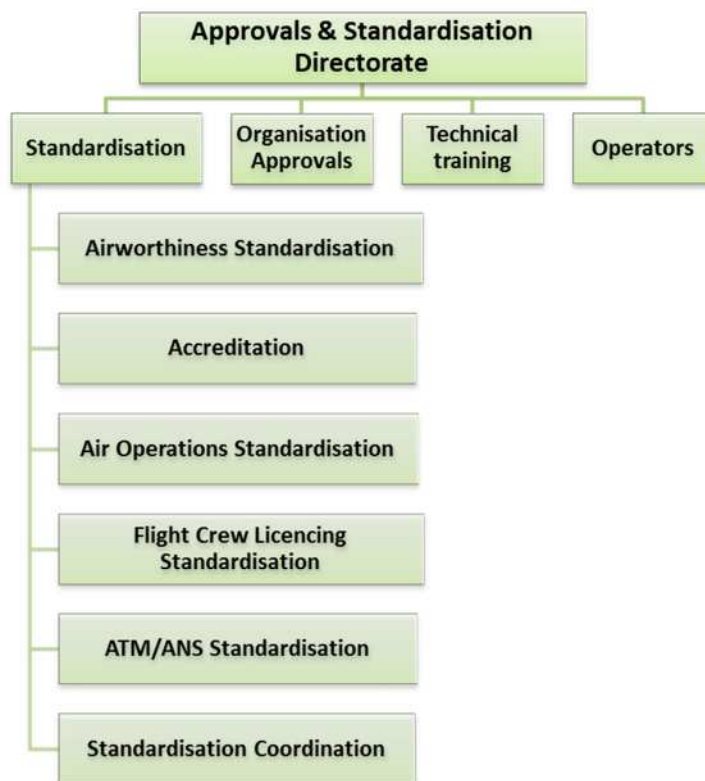
The EASA Approvals and Standardisation Directorate [52] is responsible for ensuring that the EU aviation safety legislation is properly, uniformly and consistently applied Articles 24 (Monitoring the application of the rules) , 54 (Inspections of Member States) and 55 (Investigation of undertakings) 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.



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:

- 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.

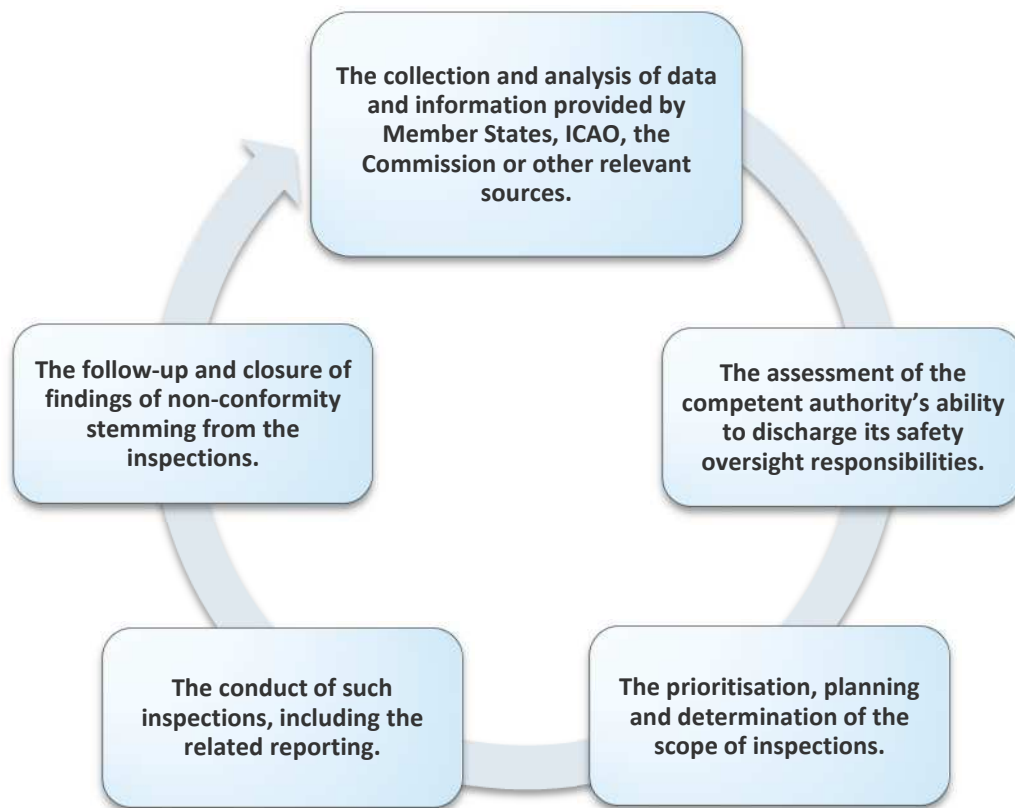
The information are provided in a form and a manner specified by the Agency, taking into account the information that has been made available to ICAO. In general web-based interfaces are used.

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;



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.

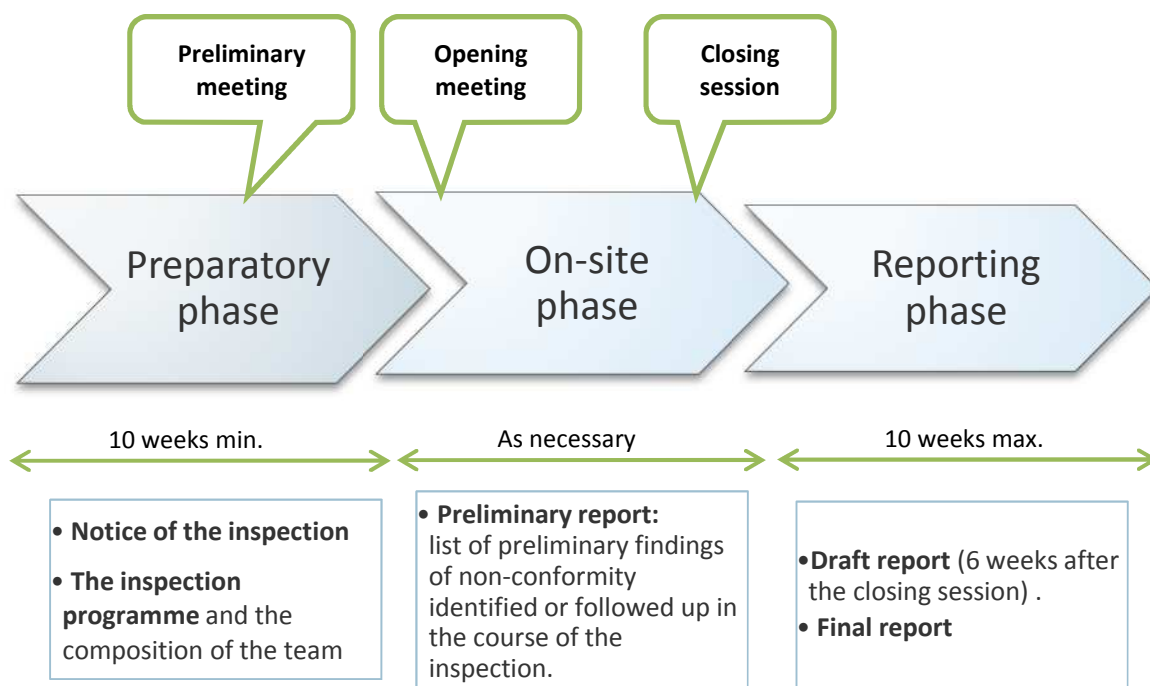
4. Perform inspections where appropriate, when appropriate, as in-depth as appropriate

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.

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.

- 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 non-conformity 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.

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 web-based 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:

- 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.

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

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);

Ref: ASCOS_WP2_IoA_D2.3
Issue: 1.0

Page: 119
Classification: Restricted

- 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]:

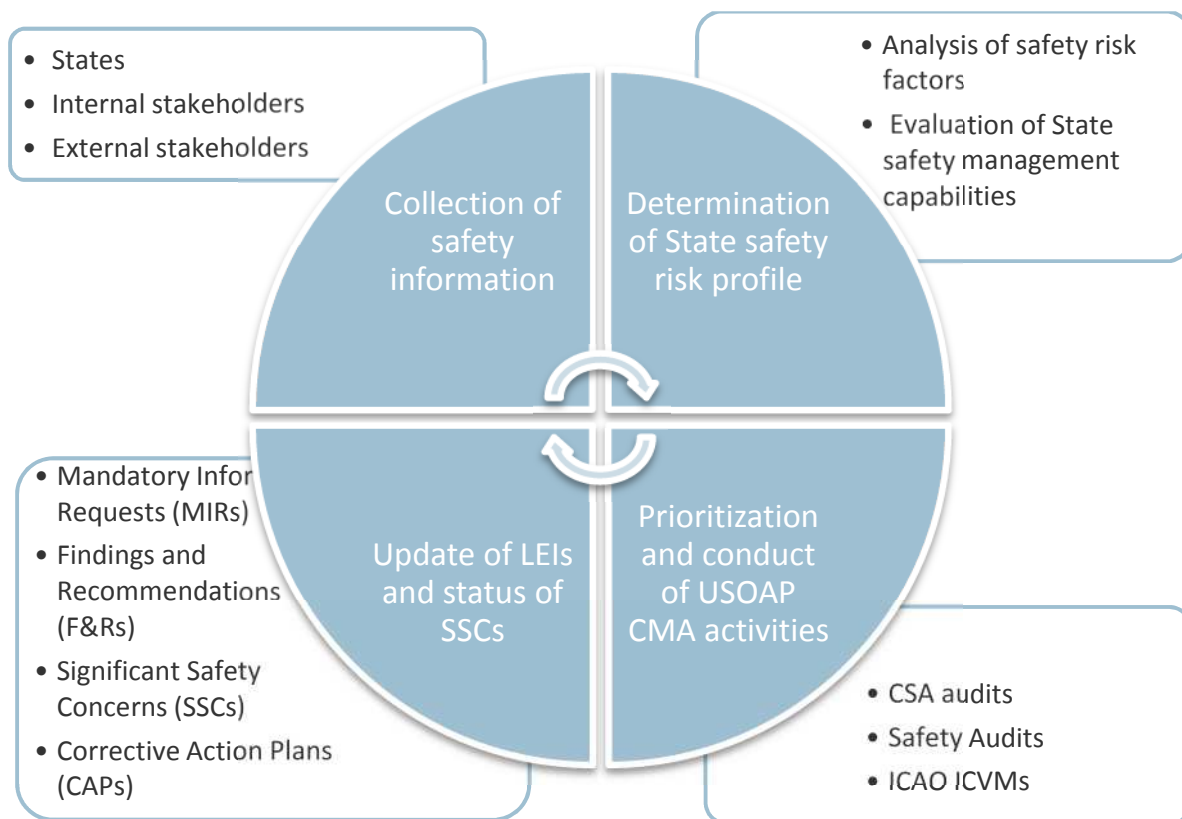
- e) collection of safety information;
- f) determination of State safety risk profile;
- g) prioritization and conduct of USOAP CMA activities; and
- h) update of the Lack of Effective Implementation (LEI) and the status of Significant Safety Concerns (SSCs).

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.



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

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 (NCCMs) to act, on an on-going basis, as primary point(s) of contact for all USOAP CMA processes and activities.

The NCCM 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,

Ref: ASCOS_WP2_IoA_D2.3
Issue: 1.0

Page: 122
Classification: Restricted

- 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.

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 query;
- 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.

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;

- 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,

- **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.

- 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:

- 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.

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]*

Table of Contents

Appendix A.1	SPIs linked to uneventful events	2
Appendix A.2	SPIs linked to procedural and flight path deviations.....	116

Appendix A.1 SPIs linked to uneventful events

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
	TECHNOLOGY	Occurrences: Uneventful events	GCOL	LOC-I	CFT	MAC	RE-TO	RE-L
1	Rate of autoflight system failures/flight	System failure affecting the operation of primary instruments / displays or standby instruments		V		V	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				V		
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		V				
10		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution		V				
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			V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
2		Contaminated Runway		V			V	
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			V	
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			V	
27		Prolonged loss of communications (PLOC) between pilot and controller(s)					V	
28		Landing gear retraction failure					V	
29		Engine failure					V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			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		V	V	V	V	
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	V		
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				V		
22		Convective weather encounter in traffic intensive airport proximity				V		

No.	Safety Performance Indicators	Precursors	Operational issue					
			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			V	
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			V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			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			V	
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			V	
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					V	
26		Prolonged loss of communications (PLOC) between pilot and controller(s)					V	
27		Landing gear retraction failure					V	
28		Engine failure					V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			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	V	V				
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			V	
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		V				
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	V					
15		Stand confusion	V					
16		Lack of adherence to SOP for GND movements in terms of marshalling procedure	V					
17		Lack of adherence to SOP for GND movements in terms of flight crew - ground crew communication.	V					
18		Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	V					
19		Flaws in ground equipment maintenance process	V					
20		Landing gear retraction failure					V	
21		Prolonged loss of communications (PLOC) between pilot and controller(s)					V	
22		Engine failure					V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
23		Cabin pressure drop as a result of pneumatic system failure					V	
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		V			V	
2		System failure affecting the operation of primary instruments / displays or standby instruments		V			V	
3		Extreme icing conditions encounter		V			V	
4		Contaminated Runway		V			V	
5		Convective weather encounter		V				
6		Convective weather - heavy rain / hail resulted with engine compressor failure		V				
7		Bird strike		V				
8		Volcanic ash encounter		V				
9		Fuel leak		V				
10		Extreme turbulence encounter		V				
11		Windshear encounter		V				
12		Failures resulting in a non-standard fuel distribution		V				
13		Tire burst		V				
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	

No.	Safety Performance Indicators	Precursors	Operational issue					
			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		V				
29		Engine suffers severe surge		V				
30		Convective weather - heavy rain resulted with wet RWY surface					V	
1	Rate of landing gear system failures/flight	Contaminated Runway		V			V	V
2		Tire burst		V			V	V
3		System failure affecting aircraft configuration, controllability and/or flying qualities		V			V	
4		Wildlife incursion		V			V	V
5		System failure affecting the operation of primary instruments / displays or standby instruments		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		Volcanic ash encounter			V			
9		Bird strike			V		V	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			V			

No.	Safety Performance Indicators	Precursors	Operational issue					
			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						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		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	V					
34		Stand confusion	V					
35		Landing gear retraction failure					V	
36		Lack of adherence to SOP for GND movements in terms of marshalling procedure	V					
37		Lack of adherence to SOP for GND movements in terms of flight crew - ground crew communication.	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				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		Engine stops during start or approach / landing		V				

No.	Safety Performance Indicators	Precursors	Operational issue					
			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					V	
55		Risk of dangerous occurrences appeared during take-off roll					V	
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					V	
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			V	
3		System failure affecting the operation of primary instruments / displays or standby instruments		V			V	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				V
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				

No.	Safety Performance Indicators	Precursors	Operational issue					
			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			V	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	V	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 communication.	V					
35		Flaws in ground equipment maintenance process	V					
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	

No.	Safety Performance Indicators	Precursors	Operational issue					
			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					V	
52		Frontal surface encounter						V
53		Convective weather / turbulence / windshear encounter conditions during landing						V
54		Risk of dangerous occurrences 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						V
56		Bounced landing						V
57		Deep (long) landing						V
58		Temporary loss of directional control during rollout						V

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
	HUMAN	Occurrences: Uneventful events	GCOL	LOG-I	CHT	MAC	RE-TO	RE-L
1	Rate of runway incursions/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		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					V	
22		Engine failure					V	
23		Cabin pressure drop as a result of pneumatic system failure					V	
24		Risk of dangerous occurrences 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				

No.	Safety Performance Indicators	Precursors	Operational issue					
			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	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 communication.	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	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			V	
3		Extreme icing conditions encounter		V			V	
4		Convective weather encounter		V				V
5		Contaminated Runway		V			V	
6		Bird strike		V			V	
7		Extreme turbulence encounter		V				

No.	Safety Performance Indicators	Precursors	Operational issue					
			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.		V				
37		Prolonged loss of communications (PLOC) between pilot and controller(s)					V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			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 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						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	V
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 bank angle alerts/flight	System failure affecting the operation of primary instruments / displays or standby instruments		V			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			V	
10		Extreme turbulence encounter		V				
11		Windshear encounter		V				
12		Bird strike		V			V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			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 occurrences 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				

No.	Safety Performance Indicators	Precursors	Operational issue					
			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
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				
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				
20		Prolonged loss of communications (PLOC) between pilot and controller(s)			V			V
21		Engine overheating		V				
22		GPWS / TAWS alert / warning (genuine or spurious)			V			

No.	Safety Performance Indicators	Precursors	Operational issue					
			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		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		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				
36		Engine stops during start or approach / landing		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		Natural or artificial obstacle on runway course			V			
41		Landing gear retraction failure					V	
42		Engine failure					V	
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		V				V
48		Crew incapacitation resulted from illness (e.g. food poisoning)		V				
49		System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)		V				V
50		Severe failure of all engines on transoceanic route or over rarely populated area		V				
51		Missed approach execution necessary after prolonged flight due to e. g. extreme weather		V				V

No.	Safety Performance Indicators	Precursors	Operational issue					
			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		V	V			V
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				V
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		V				
12		Bird strike		V				
13		Extreme turbulence 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		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			

No.	Safety Performance Indicators	Precursors	Operational issue					
			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		V				
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				V
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

No.	Safety Performance Indicators	Precursors	Operational issue						
			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

No.	Safety Performance Indicators	Precursors	Operational issue						
			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	V	V
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		V					
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					

No.	Safety Performance Indicators	Precursors	Operational issue					
			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		V				
27		GPWS / TAWS alert / warning (genuine or spurious)			V			
28		MSAW warning			V			
29		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution		V				
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		V				
33		Hard landing		V				V
34		Airspace infringement				V		
35		Other cases of loss of separation				V		
36		Prolonged loss of communication (PLOC) between pilot and controller				V		
37		Convective weather encounter in traffic intensive airport proximity				V		
38		System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System				V		
39		Bounced landing		V				V
40		Engine stops during start or approach / landing		V				
41		Deep (long) landing		V				V
42		AOA prevents missed approach		V				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		V				
44		Gross loading error		V				
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	

No.	Safety Performance Indicators	Precursors	Operational issue					
			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 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 (ROC>7)/flight	Adverse weather / poor visibility conditions / darkness	V	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	V	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		V		V
10		Extreme turbulence encounter		V				
11		Wildlife incursion		V			V	
12		Bird strike		V			V	
13		Windshear encounter		V				

No.	Safety Performance Indicators	Precursors	Operational issue						
			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					V		
27		Prolonged loss of communication (PLOC) between pilot and controller					V		
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

No.	Safety Performance Indicators	Precursors	Operational issue					
			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 communication.	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 occurrences 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		V				
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	V
2		Adverse weather / poor visibility conditions / darkness		V	V	V		V
3		Contaminated Runway		V			V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			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				

No.	Safety Performance Indicators	Precursors	Operational issue					
			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 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 occurrences 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				

No.	Safety Performance Indicators	Precursors	Operational issue					
			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			

No.	Safety Performance Indicators	Precursors	Operational issue					
			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				V		
34		Airspace infringement				V		
35		Other cases of loss of separation				V		
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				V		
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				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

No.	Safety Performance Indicators	Precursors	Operational issue						
			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		V				V	
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					

No.	Safety Performance Indicators	Precursors	Operational issue					
			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		V				
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 occurrences appeared during take-off roll					V	
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					V	
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					V	
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

No.	Safety Performance Indicators	Precursors	Operational issue					
			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		V	
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

No.	Safety Performance Indicators	Precursors	Operational issue						
			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 occurrences 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 intentionally or unknowingly							V
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	Rate of long landings/landing	Adverse weather / poor visibility conditions / darkness		V	V				V
2		Convective weather / turbulence / windshear or crosswind conditions during take-off		V					V

No.	Safety Performance Indicators	Precursors	Operational issue					
			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			
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	

No.	Safety Performance Indicators	Precursors	Operational issue					
			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		V	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						V
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

No.	Safety Performance Indicators	Precursors	Operational issue						
			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			

No.	Safety Performance Indicators	Precursors	Operational issue					
			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		V	V			V
3		System failure affecting aircraft configuration, controllability and/or flying qualities		V			V	
4		Convective weather encounter		V				V
5		Convective weather / turbulence / windshear or crosswind conditions during take-off		V				V
6		Contaminated Runway		V			V	
7		Uncommanded thrust asymmetry		V				
8		Convective weather - heavy rain / hail resulted with engine compressor failure		V				
9		Extreme icing conditions encounter		V				
10		Bird strike		V				
11		Volcanic ash encounter		V				
12		Extreme turbulence encounter		V				
13		Windshear encounter		V				
14		Failures resulting in a non-standard fuel distribution		V				
15		Fuel leak		V				
16		Inadequate fuel quality / type		V				
17		Low-on-fuel condition / fuel starvation		V				
18		Tire burst		V				
19		Engine overheating		V				
20		Wildlife incursion		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		Hard landing		V				V
29		Bounced landing		V				V
30		Deep (long) landing		V				V
31		Engine stops during start or approach / landing		V				
32		Frontal surface encounter						V

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
33		AOA prevents missed approach		V					V
34		Landing gear retraction failure						V	
35		Convective weather / turbulence / windshear encounter conditions during landing							V
36		Natural or artificial obstacle on runway course			V				
37		Engine failure						V	
38		Cabin pressure drop as a result of pneumatic system failure						V	
39		Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll						V	
40		Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown		V					V
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							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					V
45		Continued unstabilized approach (failure to comply with go-around criteria and policy)		V					V
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		V					V
48		Crew is incapable in result of shock related to hard landing		V					V
49		Crew is incapable in result of extreme turbulence		V					
50		Engine suffers severe surge		V					
51		Convective weather - heavy rain resulted with wet RWY surface						V	
1	Rate of deep landings/landing	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			V
3		System failure affecting aircraft configuration, controllability and/or flying qualities		V					
4		Convective weather / turbulence / windshear or crosswind conditions during take-off		V					V
5		Uncommanded thrust asymmetry		V					
6		Contaminated Runway		V					
7		Convective weather encounter		V					V
8		Volcanic ash encounter		V					
9		Bird strike		V					
10		Convective weather - heavy rain / hail resulted with engine compressor failure		V					
11		Fuel leak		V					
12		Extreme turbulence encounter		V					
13		Extreme icing conditions encounter		V					
14		Windshear encounter		V					
15		Inadequate fuel quality / type		V					
16		Failures resulting in a non-standard fuel distribution		V					

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
17		Tire burst		V				
18		Low-on-fuel condition / fuel starvation		V				
19		Engine overheating		V				
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				V		
31		Convective weather encounter in traffic intensive airport proximity				V		
32		System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System				V		
33		Hard landing		V				V
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				V
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		V				V
47		Crew is incapable in result of shock related to hard landing		V				V
48		Crew is incapable in result of extreme turbulence		V				
49		Engine suffers severe surge		V				
50		Failures affecting TCAS operation				V		
1	Rate of flight crew failure to deploy ground spoilers/landing	Adverse weather / poor visibility conditions / darkness		V				V

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
2		Convective weather / turbulence / windshear or crosswind conditions during take-off		V			V	V
3		Hard landing		V				V
4		Bounced landing		V				V
5		Deep (long) landing		V				V
6		AOA prevents missed approach		V				V
7		System failure affecting the operation of primary instruments / displays or standby instruments		V			V	V
8		System failure affecting aircraft configuration, controllability and/or flying qualities					V	
9		Convective weather encounter		V				V
10		Prolonged loss of communications (PLOC) between pilot and controller(s)					V	
11		Landing gear retraction failure					V	
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						V
16		Temporary loss of directional control during rollout						V
17		Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate		V			V	V
18		Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown		V				V
19		Wildlife incursion					V	
20		System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)		V				V
21		Bird strike					V	
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		V				V
27		Emergency landing					V	
28		Cautions / warnings (genuine or spurious) that may lead to a low-speed or high-speed rejected take-off					V	
29		Convective weather - heavy rain resulted with wet RWY surface					V	
30		Risk of dangerous occurrences appeared during take-off roll					V	
31		Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.					V	
1	Rate of delayed brake application/landing	Adverse weather / poor visibility conditions / darkness		V				V
2		Convective weather / turbulence / windshear or crosswind conditions during take-off		V			V	V
3		Hard landing		V				V
4		Bounced landing		V				V
5		Deep (long) landing		V				V

No.	Safety Performance Indicators	Precursors	Operational issue					
			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		V			V	V
8		System failure affecting aircraft configuration, controllability and/or flying qualities					V	
9		Convective weather encounter		V				V
10		Landing gear retraction failure					V	
11		Prolonged loss of communications (PLOC) between pilot and controller(s)					V	
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						V
16		Temporary loss of directional control during rollout						V
17		Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate		V			V	V
18		Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown		V				V
19		Wildlife incursion					V	
20		System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)		V				V
21		Bird strike					V	
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		V				V
27		Emergency landing					V	
28		Cautions / warnings (genuine or spurious) that may lead to a low-speed or high-speed rejected take-off					V	
29		Convective weather - heavy rain resulted with wet RWY surface					V	
30		Risk of dangerous occurrences appeared during take-off roll					V	
31		Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.					V	
1	Rate of delayed application of thrust reversers/landing	Adverse weather / poor visibility conditions / darkness		V				V
2		Convective weather / turbulence / windshear or crosswind conditions during take-off		V			V	V
3		Hard landing		V				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 intentionally or unknowingly						V

No.	Safety Performance Indicators	Precursors	Operational issue					
			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				V
13		Wildlife incursion					V	
14		System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)		V				V
15		Bird strike					V	
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					V	
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				V
22		Emergency landing					V	
23		Cautions / warnings (genuine or spurious) that may lead to a low-speed or high-speed rejected take-off					V	
24		Prolonged loss of communications (PLOC) between pilot and controller(s)					V	
25		Landing gear retraction failure					V	
26		Engine failure					V	
27		Cabin pressure drop as a result of pneumatic system failure					V	
28		Risk of dangerous occurrences appeared during take-off roll					V	
29		Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll					V	
30		Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.					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		Contaminated Runway		V			V	
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			V	
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	
14		Failures resulting in a non-standard fuel distribution		V				
15		Uncommanded thrust asymmetry		V				

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
16		Convective weather - heavy rain / hail resulted with engine compressor failure		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		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		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				
30		MSAW warning			V				
31		Midair collision		V					
32		Collision with ground obstacle		V					
33		Prolonged loss of communication (PLOC) between pilot and controller					V		
34		Airspace infringement					V		
35		Other cases of loss of separation					V		
36		Convective weather encounter in traffic intensive airport proximity					V		
37		Hard landing		V					V
38		System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System					V		
39		Bounced landing		V					V
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		V					
41		Engine stops during start or approach / landing		V					
42		Deep (long) landing		V					V
43		AOA prevents missed approach		V					V
44		Turbulence encounter		V					
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)		V					V
49		Natural or artificial obstacle on runway course			V				
50		Landing gear retraction failure						V	
51		Engine failure						V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
52		Cabin pressure drop as a result of pneumatic system failure					V	
53		Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly						V
54		Severe engine failure		V				
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)				V		
58		System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)		V				V
59		Severe failure of all engines on transoceanic route or over rarely populated area		V				
60		Missed approach execution necessary after prolonged flight due to e. g. extreme weather		V				V
61		Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate		V				V
62		Convective weather - heavy rain resulted with wet RWY surface					V	
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 which result in a loss of separation with another aircraft/flight	Adverse weather / poor visibility conditions / darkness		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		V			V	V
4		Prolonged loss of communications (PLOC) between pilot and controller(s)			V		V	
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		V			V	
14		Midair collision		V				
15		Collision with ground obstacle		V				
16		Airspace infringement				V		
17		Prolonged loss of communication (PLOC) between pilot and controller				V		

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
18		Cargo loading unsecured / shift		V				
19		Volcanic ash encounter		V				
20		Wildlife incursion		V			V	
21		Other cases of loss of separation				V		
22		Convective weather encounter in traffic intensive airport proximity				V		
23		System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System				V		
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		V				
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 occurrences 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		V		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		V				V
50		Cabin pressure drop as a result of aircraft structural failure		V				
51		Failures affecting TCAS operation				V		
1	Rate of incorrect flight crew response to genuine TCAS	System failure affecting the operation of primary instruments / displays or standby instruments		V	V	V	V	

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
	RA warnings/warning								
2		System failure affecting aircraft configuration, controllability and/or flying qualities		V				V	
3		Contaminated Runway		V				V	
4		Volcanic ash encounter		V					
5		Convective weather encounter		V		V			
6		Wildlife incursion		V				V	
7		Extreme turbulence encounter		V					
8		Bird strike		V				V	
9		Windshear encounter		V					
10		Failures resulting in a non-standard fuel distribution		V					
11		Uncommanded thrust asymmetry		V					
12		Convective weather - heavy rain / hail resulted with engine compressor failure		V					
13		Extreme icing conditions encounter		V					
14		Fuel leak		V					
15		Inadequate fuel quality / type		V					
16		Low-on-fuel condition / fuel starvation		V					
17		Tire burst		V					
18		Engine overheating		V					
19		Prolonged loss of communications (PLOC) between pilot and controller(s)			V			V	
20		Adverse weather / poor visibility conditions / darkness		V	V	V			
21		Ground Navigational Aid failure			V				
22		Inadequate NOTAM information concerning ground navigational aid failure			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		Error in preparation of database for FMS			V				
26		Inadequate navigational chart			V				
27		GPWS / TAWS alert / warning (genuine or spurious)			V				
28		MSAW warning			V				
29		Cargo loading unsecured / shift		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		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		V					

No.	Safety Performance Indicators	Precursors	Operational issue						
			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		V					
39		Turbulence encounter		V					
40		Frontal surface encounter		V					
41		Emergency landing						V	
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						V	
48		Risk of dangerous occurrences appeared during take-off roll						V	
49		Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.						V	
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)				V			
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						V	
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		V	V	V	V	V	V
2		Adverse weather / poor visibility conditions / darkness		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		Convective weather / turbulence / windshear or crosswind conditions during take-off		V				V	V
7		Convective weather encounter		V		V			V
8		Extreme turbulence encounter		V					
9		Wildlife incursion		V				V	
10		Bird strike		V				V	
11		Windshear encounter		V					
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					

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
15		Extreme icing conditions encounter		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		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		GPWS / TAWS alert / warning (genuine or spurious)			V				
25		MSAW warning			V				
26		Error in preparation of database for FMS			V				
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		V					
31		Midair collision		V					
32		Collision with ground obstacle		V					
33		Airspace infringement					V		
34		Prolonged loss of communication (PLOC) between pilot and controller					V		
35		Other cases of loss of separation					V		
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					V		
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					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		Emergency landing						V	
46		Frontal surface encounter		V					
47		Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.						V	
48		Natural or artificial obstacle on runway course			V				
49		Landing gear retraction failure						V	
50		Engine failure						V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
51		Cabin pressure drop as a result of pneumatic system failure					V	
52		Risk of dangerous occurrences appeared during take-off roll					V	
53		Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll					V	
54		Gross loading error		V				
55		Severe engine failure		V				
56		Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown		V				V
57		Crew incapacitation resulted from illness (e.g. food poisoning)		V				
58		TCAS RA events (genuine or spurious)				V		
59		Continued unstabilized approach (failure to comply with go-around criteria and policy)		V				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				V
64		Convective weather - heavy rain resulted with wet RWY surface					V	
65		Crew is incapable in result of shock related to hard landing		V				V
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		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		V	V	V	V	V
2		Adverse weather / poor visibility conditions / darkness		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		Convective weather / turbulence / windshear or crosswind conditions during take-off		V			V	V
7		Convective weather encounter		V		V		V
8		Extreme turbulence encounter		V				
9		Wildlife incursion		V			V	
10		Bird strike		V			V	
11		Windshear encounter		V				
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				
15		Extreme icing conditions encounter		V				
16		Fuel leak		V				
17		Inadequate fuel quality / type		V				

No.	Safety Performance Indicators	Precursors	Operational issue						
			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		V					
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				V			
34		Prolonged loss of communication (PLOC) between pilot and controller				V			
35		Other cases of loss of separation				V			
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				V			
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					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		Emergency landing						V	
47		Gross loading error		V					
48		Natural or artificial obstacle on runway course			V				
49		Landing gear retraction failure						V	
50		Engine failure						V	
51		Cabin pressure drop as a result of pneumatic system failure						V	
52		Risk of dangerous occurrences appeared during take-off roll						V	
53		Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll						V	

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
54		Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.					V		
55		Severe engine failure		V					
56		Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown		V				V	
57		Crew incapacitation resulted from illness (e.g. food poisoning)		V					
58		TCAS RA events (genuine or spurious)				V			
59		Continued unstabilized approach (failure to comply with go-around criteria and policy)		V				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				V	
64		Convective weather - heavy rain resulted with wet RWY surface					V		
65		Crew is incapable in result of shock related to hard landing		V				V	
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		V					
69		Failures affecting TCAS operation				V			
1	Rate of EGPWS events/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		Convective weather encounter		V					V
4		Contaminated Runway		V				V	
5		System failure affecting aircraft configuration, controllability and/or flying qualities		V				V	
6		Volcanic ash encounter		V					
7		Convective weather / turbulence / windshear or crosswind conditions during take-off		V					V
8		Wildlife incursion		V					
9		Failures resulting in a non-standard fuel distribution		V					
10		Uncommanded thrust asymmetry		V					
11		Bird strike		V					
12		Convective weather - heavy rain / hail resulted with engine compressor failure		V					
13		Extreme icing conditions encounter		V					
14		Extreme turbulence encounter		V					
15		Windshear encounter		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					

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
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		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		V					
30		Error in preparation of database for FMS			V				
31		Frontal surface encounter		V					V
32		Midair collision		V					
33		Collision with ground obstacle		V					
34		Hard landing		V					V
35		Bounced landing		V					V
36		Deep (long) landing		V					V
37		Engine stops during start or approach / landing		V					
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		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	
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	
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		V					V
52		Crew incapacitation resulted from illness (e.g. food poisoning)		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

No.	Safety Performance Indicators	Precursors	Operational issue						
			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 response to genuine EGPWS warnings/warning	System failure affecting the operation of primary instruments / displays or standby instruments		V	V			V	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		V					
8		Bird strike		V					
9		Extreme icing conditions encounter		V					
10		Adverse weather / poor visibility conditions / darkness		V	V				
11		Extreme turbulence encounter		V					
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		V					
16		Tire burst		V					
17		Uncommanded thrust asymmetry		V					
18		Inadequate fuel quality / type		V					
19		Prolonged loss of communications (PLOC) between pilot and controller(s)			V			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				
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		V					
27		Error in preparation of database for FMS			V				
28		Inadequate navigational chart			V				
29		Cargo loading unsecured / shift		V					
30		Frontal surface encounter		V					V
31		Midair collision		V					

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
32		Collision with ground obstacle		V				
33		Engine stops during start or approach / landing		V				
34		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				
35		Convective weather / turbulence / windshear encounter conditions during landing						V
36		Gross loading error		V				
37		Natural or artificial obstacle on runway course			V			
38		Landing gear retraction failure					V	
39		Engine failure					V	
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		V				
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 which result in a loss of separation with terrain/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	
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

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
9		Tire burst		V			V	
10		Convective weather encounter		V				V
11		Extreme icing conditions encounter		V			V	
12		Convective weather - heavy rain / hail resulted with engine compressor failure		V				
13		Extreme turbulence encounter		V				
14		Failures resulting in a non-standard fuel distribution		V				
15		Uncommanded thrust asymmetry		V				
16		Fuel leak		V				
17		Windshear encounter		V				
18		Low-on-fuel condition / fuel starvation		V				
19		Inadequate fuel quality / type		V				
20		Prolonged loss of communications (PLOC) between pilot and controller(s)			V		V	
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		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		Cargo loading unsecured / shift		V				
33		Hard landing		V				V
34		Bounced landing		V				V
35		Engine stops during start or approach / landing		V				
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			
42		Landing gear retraction failure					V	
43		Engine failure					V	
44		Cabin pressure drop as a result of pneumatic system failure					V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			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 intentionally or unknowingly						V
48		Severe engine failure		V				
49		Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate		V			V	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		System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)		V				V
53		Severe failure of all engines on transoceanic route or over rarely populated area		V				
54		Missed approach execution necessary after prolonged flight due to e. g. extreme weather		V				V
55		Convective weather - heavy rain resulted with wet RWY surface					V	
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				
1	Rate of MSAW warnings/flight	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
3		Convective weather encounter		V				V
4		Contaminated Runway		V			V	
5		Volcanic ash encounter		V				
6		Convective weather / turbulence / windshear or crosswind conditions during take-off		V				V
7		System failure affecting aircraft configuration, controllability and/or flying qualities		V			V	
8		Wildlife incursion		V				
9		Failures resulting in a non-standard fuel distribution		V				
10		Bird strike		V				
11		Extreme icing conditions encounter		V				
12		Extreme turbulence encounter		V				
13		Convective weather - heavy rain / hail resulted with engine compressor failure		V				
14		Windshear encounter		V				
15		Fuel leak		V				
16		Low-on-fuel condition / fuel starvation		V				
17		Tire burst		V				
18		Uncommanded thrust asymmetry		V				
19		Inadequate fuel quality / type		V				
20		Prolonged loss of communications (PLOC) between pilot and controller(s)			V		V	
21		Engine overheating		V				

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
22		GPWS / TAWS alert / warning (genuine or spurious)			V			
23		MSAW warning			V			
24		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution		V				
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			
28		Error in preparation of database for FMS			V			
29		Inadequate navigational chart			V			
30		Cargo loading unsecured / shift		V				
31		Frontal surface encounter		V				V
32		Midair collision		V				
33		Collision with ground obstacle		V				
34		Hard landing		V				V
35		Airspace infringement				V		
36		Other cases of loss of separation				V		
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				V		
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		V				
44		AOA prevents missed approach		V				V
45		Gross loading error		V				
46		Convective weather / turbulence / windshear encounter conditions during landing						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		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 intentionally or unknowingly						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		V				V

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
57		Crew incapacitation resulted from illness (e.g. food poisoning)		V				
58		TCAS RA events (genuine or spurious)				V		
59		Continued unstabilized approach (failure to comply with go-around criteria and policy)		V				V
60		Severe failure of all engines on transoceanic route or over rarely populated area		V				
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		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 misuse of automation events/flight	Adverse weather / poor visibility conditions / darkness		V				V
2		Convective weather / turbulence / windshear or crosswind conditions during take-off		V				V
3		System failure affecting the operation of primary instruments / displays or standby instruments		V				V
4		System failure affecting aircraft configuration, controllability and/or flying qualities		V				
5		Hard landing		V				V
6		Convective weather encounter		V				V
7		Bounced landing						V
8		Deep (long) landing						V
9		AOA prevents missed approach						V
10		Extreme icing conditions encounter		V				
11		Extreme turbulence encounter		V				
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 intentionally or unknowingly						V
16		Temporary loss of directional control during rollout						V
17		Wildlife incursion						V
18		Bird strike						V
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		V				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

No.	Safety Performance Indicators	Precursors	Operational issue					
			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		V			V	
2		System failure affecting aircraft configuration, controllability and/or flying qualities		V			V	
3		Extreme icing conditions encounter		V			V	
4		Convective weather encounter		V				V
5		Contaminated Runway		V			V	
6		Bird strike		V			V	
7		Extreme turbulence encounter		V				
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	

No.	Safety Performance Indicators	Precursors	Operational issue					
			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)					V	
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 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						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	V
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		V			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			V	
10		Extreme turbulence encounter		V				
11		Windshear encounter		V				
12		Bird strike		V			V	
13		Failures resulting in a non-standard fuel distribution		V				

No.	Safety Performance Indicators	Precursors	Operational issue					
			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		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 occurrences 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				
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

No.	Safety Performance Indicators	Precursors	Operational issue						
			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		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						V	
22		Engine failure						V	
23		Cabin pressure drop as a result of pneumatic system failure						V	
24		Risk of dangerous occurrences 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					
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	V	V					
3		Adverse weather / poor visibility conditions / darkness	V	V					
4		Emergency landing	V					V	

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
5		Contaminated Runway		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		Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	V					V	
12		Runway confusion	V						
13		Taxiway confusion	V						
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						
16		Taxiway incursion	V						
17		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					
18		Bird strike		V				V	
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						
22		Lack of adherence to SOP for GND movements in terms of flight crew - ground crew communication.	V						
23		Convective weather / turbulence / windshear or crosswind conditions during take-off						V	
24		Risk of dangerous occurrences appeared during take-off roll						V	
25		System failure affecting aircraft configuration, controllability and/or flying qualities		V				V	
26		Extreme turbulence encounter		V					
27		System failure affecting the operation of primary instruments / displays or standby instruments		V					
28		Crew incapacitation resulted from illness (e.g. food poisoning)		V					
29		Convective weather - heavy rain resulted with wet RWY surface						V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			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	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		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					v	
22		Engine failure					v	
23		Cabin pressure drop as a result of pneumatic system failure					v	
24		Risk of dangerous occurrences appeared during take-off roll					v	

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
25		Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.					V	
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 communication.	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		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

No.	Safety Performance Indicators	Precursors	Operational issue					
			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		V				
7		Bird strike		V			V	
8		Contaminated Runway		V			V	
9		Windshear encounter		V				
10		Failures resulting in a non-standard fuel distribution		V				
11		Uncommanded thrust asymmetry		V				
12		Convective weather - heavy rain / hail resulted with engine compressor failure		V				
13		Extreme icing conditions encounter		V				
14		Volcanic ash encounter		V				
15		Wildlife incursion		V			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		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	V	V				
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		
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				V		
29		Hard landing		V				V
30		Runway confusion	V					
31		Engine stops during start or approach / landing		V				

No.	Safety Performance Indicators	Precursors	Operational issue					
			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		V				
38		Frontal surface encounter		V				
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					V	
46		Cabin pressure drop as a result of pneumatic system failure					V	
47		Risk of dangerous occurrences 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		V				
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)		V				V
54		System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)		V				V
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		V				V
57		Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate		V				V
58		Convective weather - heavy rain resulted with wet RWY surface					V	
59		Crew is incapable in result of shock related to hard landing		V				V

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
60		Cabin pressure drop as a result of aircraft structural failure		V				
61		Crew is incapable in result of extreme turbulence		V				
62		Engine suffers severe surge		V				
63		Failures affecting TCAS operation				V		
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	V	V	V	V
3		Convective weather encounter		V		V		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				
8		Windshear encounter		V				
9		Bird strike		V			V	
10		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	V	V				
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				
17		Failures resulting in a non-standard fuel distribution		V				
18		Tire burst		V				
19		Uncommanded thrust asymmetry		V				
20		Inadequate fuel quality / type		V				
21		Low-on-fuel condition / fuel starvation		V				
22		Frontal surface encounter		V				V
23		Engine overheating		V				

No.	Safety Performance Indicators	Precursors	Operational issue					
			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)			V			
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				V
32		Bounced landing		V				V
33		Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate		V			V	V
34		Emergency landing	V				V	
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						V
41		Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	V				V	
42		Deep (long) landing		V				V
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		V				V
49		Flaws in ground equipment maintenance process	V					
50		Turbulence encounter		V				
51		Lack of adherence to SOP for GND movements in terms of marshalling procedure	V					

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
52		Stand confusion	V					
53		Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure)	V					
54		Lack of adherence to SOP for GND movements in terms of flight crew - ground crew communication.	V					
55		Contaminated wing		V			V	
56		Continued unstabilized approach (failure to comply with go-around criteria and policy)		V				V
57		Convective weather / turbulence / windshear encounter conditions during landing						V
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.		V				
60		Natural or artificial obstacle on runway course			V			
61		Risk of dangerous occurrences 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				V
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		V				
67		Crew incapacitation resulted from illness (e.g. food poisoning)		V				
68		TCAS RA events (genuine or spurious)				V		
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				V
71		Convective weather - heavy rain resulted with wet RWY surface					V	
72		Crew is incapable in result of shock related to hard landing		V				V
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					V	
76		Failures affecting TCAS operation				V		
1	System combined bird strike rate	Bird strike		V			V	V
2		Contaminated Runway		V			V	V

No.	Safety Performance Indicators	Precursors	Operational issue					
			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		V				
11		Fuel leak		V				
12		Extreme icing conditions encounter		V				
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				V
21		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology		V				V
22		Emergency landing					V	
23		Convective weather / turbulence / windshear or crosswind conditions during take-off					V	
24		Risk of dangerous occurrences 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		Severe engine failure		V				
27		Adverse weather / poor visibility conditions / darkness		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		Crew incapacitation resulted from illness (e.g. food poisoning)		V				
30		Severe failure of all engines on transoceanic route or over rarely populated area		V				

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
31		Convective weather - heavy rain resulted with wet RWY surface					V	
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			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	V
9		Tire burst		V			V	V
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		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				

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
22		Engine overheating		V				
23		Prolonged loss of communications (PLOC) between pilot and controller(s)			V		V	
24		Frontal surface encounter		V				V
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				V
33		Emergency landing	V				V	
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		V				
48		Deep (long) landing		V				V

No.	Safety Performance Indicators	Precursors	Operational issue					
			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 communication.	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		Risk of dangerous occurrences 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.		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					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				

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
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	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		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			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	V
9		Tire burst		V			V	V
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		V				
16		Uncommanded thrust asymmetry		V				
17		Failures resulting in a non-standard fuel distribution		V				

No.	Safety Performance Indicators	Precursors	Operational issue					
			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		V	
24		Frontal surface encounter		V				V
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				V
33		Emergency landing	V				V	
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

No.	Safety Performance Indicators	Precursors	Operational issue					
			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					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

No.	Safety Performance Indicators	Precursors	Operational issue					
			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)				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 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	V		V
2		Convective weather / turbulence / windshear or crosswind conditions during take-off		V			V	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	V	V				V
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			

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
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			V	V
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	V					
27		Hard landing		V				V
28		Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWY.	V					
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		V				
31		Bounced landing		V				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		V				V

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
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 communication.	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			V	
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				V
55		Crew is incapable in result of shock related to hard landing		V				V
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						V
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			V	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	V	V				V

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
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			
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			V	V
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	V					
27		Hard landing		V				V
28		Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWY.	V					
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		V				
31		Bounced landing		V				V
32		Deep (long) landing		V				V

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
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		V				V
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 communication.	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			V	
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				V
55		Crew is incapable in result of shock related to hard landing		V				V
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						V
59		Temporary loss of directional control during rollout						V
1	The safety impact of each	System failure affecting the operation of primary instruments / displays or standby instruments		V	V	V	V	V

No.	Safety Performance Indicators	Precursors	Operational issue							
			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	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		V				V		V
8		Wildlife incursion		V				V		V
9		Bird strike		V				V		V
10		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	V	V						V
11		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	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						
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
25		GPWS / TAWS alert / warning (genuine or spurious)			V					

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
26		MSAW warning			V			
27		Cargo loading unsecured / shift		V				
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		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						V
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		V				
51		AOA prevents missed approach		V				V
52		Flaws in ground equipment maintenance process	V					

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
53		Taxiway incursion	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 marshalling procedure	V					
58		Lack of adherence to SOP for GND movements in terms of flight crew - ground crew communication.	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 occurrences 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				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)				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

No.	Safety Performance Indicators	Precursors	Operational issue					
			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		V			V	
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		V			V	V
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				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		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				

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
22		Engine overheating		V				
23		Prolonged loss of communications (PLOC) between pilot and controller(s)			V		V	
24		Frontal surface encounter		V				V
25		GPWS / TAWS alert / warning (genuine or spurious)			V			
26		MSAW warning			V			
27		Cargo loading unsecured / shift		V				
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		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						V
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					

No.	Safety Performance Indicators	Precursors	Operational issue						
			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	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 communication.	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 occurrences 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					V
75		System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)		V					V
76		Severe engine failure		V					

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
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		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	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		V			V	V
4		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	V	V				
5		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	V	V				
6		Prolonged loss of communications (PLOC) between pilot and controller(s)			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		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				

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
17		Airspace infringement				V		
18		Midair collision		V				
19		Collision with ground obstacle		V				
20		Prolonged loss of communication (PLOC) between pilot and controller				V		
21		Other cases of loss of separation				V		
22		Convective weather encounter in traffic intensive airport proximity				V		
23		System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System				V		
24		Wildlife incursion		V			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					
28		Hard landing		V				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		V				
32		Bounced landing		V				V
33		Deep (long) landing		V				V
34		AOA prevents missed approach		V				V
35		Convective weather encounter		V		V		V
36		Extreme turbulence encounter		V				
37		Bird strike		V			V	
38		Taxiway incursion	V					
39		Stand confusion	V					
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 marshalling procedure	V					
42		Lack of adherence to SOP for GND movements in terms of flight crew - ground crew communication.	V					
43		Flaws in ground equipment maintenance process	V					
44		Windshear encounter		V				

No.	Safety Performance Indicators	Precursors	Operational issue					
			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					V	
51		Cabin pressure drop as a result of pneumatic system failure					V	
52		Risk of dangerous occurrences 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				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				V
60		Convective weather - heavy rain resulted with wet RWY surface					V	
61		Crew is incapable in result of shock related to hard landing		V				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		V			V	V
4		Prolonged loss of communications (PLOC) between pilot and controller(s)			V		V	
5		Ground Navigational Aid failure			V			
6		Inadequate NOTAM information concerning ground navigational aid failure			V			
7		GPWS / TAWS alert / warning (genuine or spurious)			V			

No.	Safety Performance Indicators	Precursors	Operational issue					
			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 communication.	V					

No.	Safety Performance Indicators	Precursors	Operational issue					
			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					V	
43		Frontal surface encounter		V				
44		Engine failure					V	
45		Cabin pressure drop as a result of pneumatic system failure					V	
46		Risk of dangerous occurrences appeared during take-off roll					V	
47		Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown		V				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		V				
49		Crew incapacitation resulted from illness (e.g. food poisoning)		V				
50		TCAS RA events (genuine or spurious)				V		
51		Continued unstabilized approach (failure to comply with go-around criteria and policy)		V				V
52		System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)		V				V
53		Contaminated Runway					V	
54		Missed approach execution necessary after prolonged flight due to e. g. extreme weather		V				V
55		Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate		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		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

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
2		System failure affecting aircraft configuration, controllability and/or flying qualities		V			V	
3		Adverse weather / poor visibility conditions / darkness	V	V	V	V		V
4		Contaminated Runway		V			V	V
5		Convective weather encounter		V		V		V
6		Tire burst		V			V	V
7		Convective weather / turbulence / windshear or crosswind conditions during take-off		V			V	V
8		Wildlife incursion		V			V	V
9		Bird strike		V			V	V
10		Extreme icing conditions encounter		V			V	
11		Volcanic ash encounter		V				
12		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	V	V				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		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				V
25		GPWS / TAWS alert / warning (genuine or spurious)			V			
26		MSAW warning			V			
27		Cargo loading unsecured / shift		V				
28		Error in preparation of database for FMS			V			
29		Ground Navigational Aid failure			V			

No.	Safety Performance Indicators	Precursors	Operational issue					
			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			V	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		V				
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 communication.	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					

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
57		Stand confusion	V					
58		Landing gear retraction failure					V	
59		Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll					V	
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					V	
64		Cabin pressure drop as a result of pneumatic system failure					V	
65		Contaminated wing		V			V	
66		Gross loading error		V				
67		Natural or artificial obstacle on runway course			V			
68		Temporary loss of directional control during rollout						V
69		Cautions / warnings (genuine or spurious) that may lead to a low-speed or high-speed rejected take-off					V	
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					V	
72		System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)		V				V
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				V
78		Crew is incapable in result of shock related to hard landing		V				V
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		V	V	V	V	V

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
2		Adverse weather / poor visibility conditions / darkness	V	V	V	V		V
3		System failure affecting aircraft configuration, controllability and/or flying qualities		V			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	V
9		Tire burst		V			V	V
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		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				V
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			

No.	Safety Performance Indicators	Precursors	Operational issue					
			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				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		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				

No.	Safety Performance Indicators	Precursors	Operational issue					
			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 communication.	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		Risk of dangerous occurrences 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.		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					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)				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				

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
85		Failures affecting TCAS operation				V		
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	V	V		V
3		System failure affecting aircraft configuration, controllability and/or flying qualities		V			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	V
9		Tire burst		V			V	V
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		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				V

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
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				V
33		Emergency landing	V				V	
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		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				

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
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 communication.	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 occurrences 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				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)					V	
79		Severe failure of all engines on transoceanic route or over rarely populated area		V				

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
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	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	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			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	V	
9		Tire burst		V			V	V	
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		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					

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
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				V
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				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		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		V				

No.	Safety Performance Indicators	Precursors	Operational issue						
			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	V						
53		AOA prevents missed approach		V					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 marshalling procedure	V						
58		Lack of adherence to SOP for GND movements in terms of flight crew - ground crew communication.	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 occurrences 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					V

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
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 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	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				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	V
9		Tire burst		V				V	V
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					

No.	Safety Performance Indicators	Precursors	Operational issue					
			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				V
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				V
33		Emergency landing	V				V	
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		

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
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		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 communication.	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			

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
70		Convective weather - heavy rain resulted with wet RWY surface					V	
71		Risk of dangerous occurrences 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				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)				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	V	V	V	V		V
3		System failure affecting aircraft configuration, controllability and/or flying qualities		V			V	
4		Contaminated Runway		V			V	V
5		Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	V	V				V
6		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	V	V				V
7		Tire burst		V			V	V

No.	Safety Performance Indicators	Precursors	Operational issue					
			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		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		GPWS / TAWS alert / warning (genuine or spurious)			V			
25		MSAW warning			V			
26		Cargo loading unsecured / shift		V				
27		Ground Navigational Aid failure			V			
28		Inadequate NOTAM information concerning ground navigational aid failure			V			
29		Error in preparation of database for FMS			V			
30		Inadequate navigational chart			V			
31		Emergency landing	V				V	
32		Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate		V			V	V
33		Frontal surface encounter		V				V
34		Midair collision		V				
35		Collision with ground obstacle		V				

No.	Safety Performance Indicators	Precursors	Operational issue					
			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				V
39		Other cases of loss of separation				V		
40		Convective weather encounter in traffic intensive airport proximity				V		
41		System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System				V		
42		Bounced landing		V				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		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				V
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				V
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 communication.	V					
58		Landing gear retraction failure					V	
59		Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll					V	
60		Contaminated wing		V			V	
61		Gross loading error		V				
62		Convective weather / turbulence / windshear encounter conditions during landing						V
63		Engine failure					V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			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.		V				
67		Natural or artificial obstacle on runway course			V			
68		Convective weather - heavy rain resulted with wet RWY surface					V	
69		Risk of dangerous occurrences appeared during take-off roll					V	
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						V
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

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
	TECHNOLOGY	Deviations: procedural or flight path	GCOL	LOC-I	CFIT	MAC	RE-TO	RE-L
131	Rate of autoflight system failures/flight	Pilot tiredness - Inadequate workload distribution		V		V	V	
132		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	V	
135		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)		V		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		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components				V	V	
138		Flaws in manufacturer quality control process - Onboard navigational systems and components.				V	V	
139		Lack of or poor communication quality				V	V	
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		V		V	V	
142		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.				V	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	V	
144		Flaws in manufacturer quality control process - Communication equipment systems and components.				V	V	
145		Navigation deviation				V	V	
146		Flaws in manufacturer quality control process - Fire extinguishing system components				V	V	
147		Lack of English proficiency				V		
148		Incorrect or confusing / misleading ATC instructions				V		
149		Use of non-standard phraseology by pilot and/or controller				V		
150		Traffic controller tiredness - Inadequate workload distribution				V		
151		Flaws in traffic controller requirements definition process and/or training methodology				V		

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
152		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver				V		
153		Hearback omitted				V		
154		Altimeter setting error				V		
155		Lack of adherence to SOP for take-off procedure in terms of altimeter calibration.				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				V		
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 constraints 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 separation				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		V			V	
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	

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
178		Flaws in manufacturer quality control process - Autothrottle system in the engine.		V				V	
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.					V		
181		Lack of adherence to regulations concerning independent ATCO monitoring					V		
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		V					
190		Excessive bank angle		V					
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		V					
195		Flaws in aircraft system maintenance process definition - Anti-icing systems components		V					
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		V					
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					

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
202		Flaws in manufacturer quality control process - ADI		V					
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					V		
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					V		
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					V		
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					V		
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					V		
223		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components					V		
224		Flaws in aircraft system maintenance process definition - Fire extinguishing system components					V		

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
225		Flight below maneuvering speeds		V					
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.		V					
237		Lack of adherence to the SOP in terms of critical indicators cross-checking		V					
238		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment					V		
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.					V		
242		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.					V		
243		Poor application of T/O & RTO procedure, computation of T/O parameters					V		
244		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ACAS system components				V			
245		Inappropriate visual avoidance maneuver				V			
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			
131	Rate of electrical power system failures/flight	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology		V				V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
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		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - 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 components		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		V			V	
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			V	
144		Flaws in aircraft system maintenance process definition - Electrical wiring System		V			V	
145		Flaws in manufacturer quality control process - APU systems and / or components		V			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			V	
147		Flaws in aircraft system maintenance process definition - Components of Wing control surface system.		V			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			V	
150		Lack of adherence to SOP in terms of de-icing / anti-icing procedures.		V			V	
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		V			V	
153		Inadequate de-icing method applied		V				
154		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		V				
155		Incorrect use of automation -Engine anti-ice system		V				

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
156		Aggressive maneuvering / overcontrolling		V					
157		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Compressor in the engine		V					
158		Flaws in manufacturer quality control process - Compressor in the engine.		V					
159		Flaws in aircraft system maintenance process definition - Compressor in the engine.		V					
160		Flaws in manufacturer quality control process - Engine accessory drive components.		V					
161		Flaws in aircraft system maintenance process definition - Engine accessory drive components.		V					
162		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine accessory drive components.		V					
163		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ECAM (or similar) system components.		V					
164		Flaws in aircraft system maintenance process definition - ECAM (or similar) system components.		V					
165		Unintuitive and / or error prone system manual - Engine anti-icing system		V					
166		Lack of adherence to the SOP in terms of critical indicators cross-checking		V					
167		Lack of adherence to SOP in terms of AFM limitations		V					
168		Lack of adherence to SARPs in terms of avoiding adverse weather conditions during flight		V					
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.		V					
173		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Reduction gear in the engine		V					
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.		V					
176		Flaws in manufacturer quality control process - ECAM (or similar) system components.		V					
177		Lack of adherence to emergency procedures - Fuel starvation		V					
178		Flaws in manufacturer quality control process - Fuel system components.		V					
179		Flaws in manufacturer quality control process - Landing gear components.		V					
180		Flaws in aircraft system maintenance process definition - Landing gear components.		V					

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
181		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring		V					
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		V					
184		Flaws in aircraft system maintenance process definition - Engine anti-ice system and / or components		V					
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		V					
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		V					
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		V				V	
195		Flaws in aircraft system maintenance process definition - Fire detection system components		V				V	
196		Flaws in manufacturer quality control process - Fire detection system components		V				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		V					
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					

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
205		Lack of adherence to regulations concerning transport of DGR goods		V					
206		Separation of structural element / component of the aircraft during take-off or landing		V					
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			V		
214		Flaws in manufacturer quality control process - Fire extinguishing system components		V			V		
215		Lack of adherence to SOP in terms of awareness on supporting systems warning		V					
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		V					
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.					V		
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					V		
225		Incorrect stab-trim setting					V		
226		Undetected incorrect takeoff configuration					V		
227		Inadequate effectiveness of fire extinguishing system		V					
228		Unintuitive and / or error prone system manual - fire extinguishing system		V					
229		Incorrect use of automation - TOCW System					V		

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
230		Flaws in aircraft system maintenance process definition - TOCW System					V	
231		Unintuitive and / or error prone system manual - TOCW					V	
232		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System					V	
233		Unintuitive and / or error prone system manual - CPCS					V	
234		Flaws in aircraft system maintenance process definition - stickshaker		V			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		V			V	
238		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.					V	
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.					V	
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.)					V	
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	
245		Flaws in manufacturer quality control process - Autothrottle system in the engine.					V	
246		Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.					V	
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.					V	
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					V	
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	

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
		with requirements - antiice fluid HOT							
255		Applied de-icing / anti-icing method is not sufficient for predicted conditions					V		
256		Lack of adherence to SOP in terms of aircraft icing (condition) monitoring					V		
257		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					V		
258		Poor application of T/O & RTO procedure, failure recognition and preparedness					V		
259		Lack of adherence to AFM in terms of emergency procedures - stall recovery		V			V		
260		Lack of adherence to AFM in terms of emergency procedures - engine failure		V					
261		Inadequate stall recovery procedure for the aircraft					V		
262		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment					V		
263		Poor application of T/O & RTO procedure, braking initiation sequence					V		
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.					V		
266		Error in calculation of necessary amount of fuel		V					
267		Poor application of T/O & RTO procedure, computation of T/O parameters					V		
268		Flaws in manufacturer quality control process - Stickshaker system components					V		
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		V	V	V	V		
133		Pilot tiredness - Inadequate workload distribution		V	V	V	V		
134		Flaws in pilot requirements definition process and/or training methodology		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		
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.)		V	V	V	V		
138		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)		V	V	V	V		
139		Lack of adherence to the SOP in terms of critical indicators cross-checking		V	V				
140		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components			V	V	V		
141		Flaws in manufacturer quality control process - Onboard navigational systems and components.			V	V	V		

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
142		Lack of or poor communication quality			V	V	V		
143		Traffic controller tiredness - Inadequate workload distribution			V	V			
144		Flaws in traffic controller requirements definition process and/or training methodology			V	V			
145		Lack of English proficiency			V	V			
146		Use of non-standard phraseology by pilot and/or controller			V	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 maintenance - presence of contaminations.		V				V	
150		Inadequate aircraft de-icing / anti-icing		V				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	V		
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		V	V				
155		Unintuitive and / or error prone system manual - FMS		V	V				
156		Flaws in manufacturer quality control process - Fire extinguishing system components		V		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 immediate 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			V				
164		Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS)			V				
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)			V				

No.	Safety Performance Indicators	Precursors	Operational issue						
			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 clearance instruction			V				
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				
172		Lack of adherence to the main CRM rules			V				
173		Flaws in manufacturer quality control process - Engine systems and / or components		V					
174		Flaws in aircraft system maintenance process definition - Electrical wiring System		V				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		V				V	
177		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.				V	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.		V				V	
182		Flaws in manufacturer quality control process - Components of Wing control surface system.		V				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		V				V	
186		Flaws in aircraft system maintenance process definition - Fire warning system		V				V	
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		V				V	
189		Flaws in aircraft system maintenance process definition - Fire detection system components		V				V	
190		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components		V				V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
191		Flaws in manufacturer quality control process - Fire detection system components		V			V	
192		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		V			V	
193		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring		V			V	
194		Aggressive maneuvering / overcontrolling		V				
195		Difference indications of independent aircraft speed / altitude or attitude indicators		V				
196		Unintuitive and / or error prone system manual - CPCs					V	
197		Flaws in manufacturer quality control process - APU systems and / or components		V				
198		Incorrect or confusing / misleading ATC instructions				V		
199		Hearback omitted				V		
200		Excessive bank angle		V				
201		Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.					V	
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 calibration.				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				V		
215		Lack of adherence of airlines to time constraints 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		

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
217		Lack of adherence of airlines to declared Flight Plan.				V		
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 separation				V		
220		Incorrect use of communication equipment				V		
221		Military activity in controlled airport or located within controlled area				V		
222		General aviation activity in controlled airport or located within controlled area				V		
223		Intensified traffic related to general aviation activity e. g. over GA airport / airfield				V		
224		Deviation from flight trajectory commanded by controller				V		
225		Lack of adherence to SOP in terms of fuelling procedure		V				
226		Imbalanced and inappropriate 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		V				
232		Flaws in aircraft system maintenance process definition - Engine systems and / or components		V				
233		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Electrical / wiring system components		V				
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			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 aircraft system maintenance process definition - Fire extinguishing system components		V			V	
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					V	
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	

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
242		Flaws in aircraft system maintenance process definition - FCS systems or components		V				V	
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.		V					
246		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ECAM.		V					
247		Flaws in manufacturer quality control process - ECAM (or similar) system components.		V					
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		V					
252		Inadequate de-icing method applied		V					
253		Incorrect use of automation -Engine anti-ice system		V					
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.		V					
257		Flaws in manufacturer quality control process - Engine accessory drive components.		V					
258		Flaws in aircraft system maintenance process definition - Engine accessory drive components.		V					
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		V					
262		Lack of adherence to SARPs in terms of avoiding adverse weather conditions during flight		V					
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.		V					
265		Flaws in manufacturer quality control process - Integrity of primary aircraft structure.		V					
266		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Reduction gear in the engine		V					

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
267		Flaws in manufacturer quality control process - Reduction gear in the engine.		V					
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		V					
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				V	
280		Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.		V				V	
281		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of STCA System.					V		
282		Lack of adherence to regulations concerning independent ATCO monitoring					V		
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						V	
288		Lack of adherence to AFM in terms of emergency procedures - stall recovery		V				V	
289		Flaws in aircraft system maintenance process definition - ADI system components		V					
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					

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
292		Flaws in aircraft system maintenance process definition - TOCW System					V	
293		Inadequate effectiveness of fire extinguishing system		V				
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				
298		Flaws in aircraft system maintenance process definition - Pitot static systems components		V				
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		V				
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		V				
304		Flaws in aircraft system maintenance process definition - ASI		V				
305		Flaws in aircraft system maintenance process definition - Engine combustor		V				
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				
308		Flaws in aircraft system maintenance process definition - Engine turbine components		V				
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		V				
312		Incorrect use of automation - TOCW System					V	
313		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					V	
314		Poor application of T/O & RTO procedure, failure recognition and preparedness					V	
315		Unintuitive and / or error prone system manual - TOCW					V	
316		Lack of adherence to the SOP in terms of critical manoeuvre execution		V				

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
317		Lack of adherence to SOP in terms of safety best practices		V					
318		Lack of adherence to SOP in terms of pre-flight inspections -presence of anti-contamination covers on pitot static tube		V					
319		Lack of adherence to SOP in terms of briefing and checklist before initiating of start of taxiing and take-off		V					
320		Lack of adherence to SOP for take-off procedure in terms of speed bug checklist preparation and verification.						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		V					
324		Lack of adherence to emergency procedures - recovery from severe FCS failure		V					
325		Flaws in aircraft system maintenance process definition - stickshaker		V				V	
326		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - stickshaker system components		V				V	
327		Lack of adherence to SOP in terms of awareness on supporting systems warning - stickshaker		V				V	
328		Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing						V	
329		Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.						V	
330		Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT)						V	
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						V	
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		V					
336		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Rudder components.		V					
337		Flaws in aircraft system maintenance process definition - Rudder components.		V					
338		Flaws in manufacturer quality control process - Rudder components.		V					
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.		V					
341		Flaws in manufacturer quality control process - Horizontal stabilizer components.		V					

No.	Safety Performance Indicators	Precursors	Operational issue						
			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.		V					
344		Flaws in aircraft system maintenance process definition - Thrust reverse system in the engine.		V					
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				
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 immediate 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						V	
360		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.						V	
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						V	
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		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 - Engine sensors		V					
367		Flaws in aircraft system maintenance process definition - Engine sensors		V					

No.	Safety Performance Indicators	Precursors	Operational issue						
			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		V					
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					V		
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.					V		
378		Late or inadequate response to ACAS warning					V		
379		Unintuitive and / or error prone system manual - ECAM		V					
380		Flaws in aircraft system maintenance process definition - GPWS system components			V				
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				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		Flaws in aircraft system maintenance process definition - Fuel system components		V					
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 maintenance - presence of contaminations.		V				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					

No.	Safety Performance Indicators	Precursors	Operational issue						
			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				V	
149		Flaws in manufacturer quality control process - Fire warning system		V				V	
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		V					
152		Flaws in manufacturer quality control process - APU systems and / or components		V					
153		Flaws in aircraft system maintenance process definition - Electrical wiring System		V					
154		Inadequate maintenance of fire vulnerable aircraft parts or components		V					
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		V					
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		V					
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		V				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					

No.	Safety Performance Indicators	Precursors	Operational issue						
			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.		V				V	
166		Flaws in manufacturer quality control process - Components of Wing control surface system.		V				V	
167		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		V				V	
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		V				V	
170		Flaws in manufacturer quality control process - Fire extinguishing system components		V				V	
171		Flaws in manufacturer quality control process - Fuel system 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		Lack of adherence to the SOP in terms of critical indicators cross-checking		V					
174		Flaws in aircraft system maintenance process definition - ECAM (or similar) system components.		V					
175		Flaws in manufacturer quality control process - ECAM (or similar) system components.		V					
176		Lack of adherence to emergency procedures - Fuel starvation		V					
177		Inadequate de-icing method applied		V					
178		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		V					
179		Incorrect use of automation -Engine anti-ice system		V					
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.		V					
184		Flaws in manufacturer quality control process - Engine accessory drive components.		V					
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		Unintuitive and / or error prone system manual - Engine anti-icing system		V					
188		Lack of adherence to SOP in terms of AFM limitations		V					

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
189		Lack of adherence to SOP in terms of de-icing / anti-icing procedures.		V					
190		Lack of adherence to SARPs in terms of avoiding adverse weather conditions during flight		V					
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		V					
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		V					
207		Lack of adherence to AFM in terms of emergency procedures - fire detection and extinguishing procedure		V					
208		Inadequate effectiveness 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		V					
211		Flaws in aircraft system maintenance process definition - Engine fuel distribution system		V					
212		Unintuitive and / or error prone system manual - fire extinguishing system		V					
213		Flaws in aircraft system maintenance process definition - Engine combustor		V					

No.	Safety Performance Indicators	Precursors	Operational issue						
			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		V					
218		Flaws in manufacturer quality control process - Engine turbine components		V					
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.)						V	
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.						V	
236		Lack of adherence to AFM limitations for Take-off		V					
237		Lack of adherence to SOP in terms of load sheet preparation and verification		V					

No.	Safety Performance Indicators	Precursors	Operational issue					
			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.		V				
239		Lack of adherence to SOP in terms of AFM limitations in terms of weigh and balance		V				
240		Lack of adherence to SOP in terms of pre-flight inspections - cargo securing quality		V				
241		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					V	
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		V				
244		Lack of adherence to the current technology standards in terms of flight safety and efficiency - engines location.		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					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				
251		Flaws in manufacturer quality control process - Engine sensors		V				
252		Flaws in aircraft system maintenance process definition - Engine sensors		V				
253		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine sensors		V				
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	V	V			V	
134		Flaws in pilot requirements definition process and/or training methodology	V	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 with requirements - APU systems and / or components		V			V	
138		Flaws in aircraft system maintenance process definition - APU systems and / or components		V			V	
139		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components		V			V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
140		Flaws in aircraft system maintenance process definition - Fire detection system components		V			V	
141		Flaws in manufacturer quality control process - Fire detection system components		V			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		V			V	
145		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.		V			V	
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		V				
152		Separation of structural element / component of the aircraft during take-off or landing		V				
153		Flaws in aircraft system maintenance process definition - Fuel system components		V				
154		Lack of adherence to engine limitations		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				
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		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		V				
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	

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
164		Flaws in manufacturer quality control process - Fire extinguishing system components		V			V	
165		Lack of or poor communication quality	V				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			V	
168		Flaws in manufacturer quality control process - Components of Wing control surface system.		V			V	
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			V	
174		Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.		V			V	
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	V				
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 effectiveness of fire extinguishing system		V				
179		Unintuitive and / or error prone system manual - fire extinguishing system		V				
180		Inadvertent deviation from cleared taxi route	V					
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 airtaxi and airport topology.	V					

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
189		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	V						
190		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airtaxi 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						
193		Current airport diagram not reflecting critical changes	V						
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.		V					
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.		V					
206		Flaws in aircraft system maintenance process definition - Horizontal stabilizer components.		V					
207		Flaws in manufacturer quality control process - Horizontal stabilizer components.		V					
208		Navigation deviation						V	
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						V	
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	

No.	Safety Performance Indicators	Precursors	Operational issue						
			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					V		
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.		V					
218		Flaws in manufacturer quality control process - Thrust reverse system in the engine.		V					
219		Flaws in aircraft system maintenance process definition - Thrust reverse system in the engine.		V					
220		Lack of adherence to emergency procedures - recovery from severe FCS failure		V					
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					
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		V			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			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		Lack of adherence to the SOP in terms of critical indicators cross-checking		V					
138		Lack of adherence to SOP in terms of de-icing / anti-icing procedures.		V			V		
139		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.		V			V		
140		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		V			V		
141		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring		V					

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
142		Lack of adherence to SARPs in terms of avoiding adverse weather conditions during flight		V					
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.		V				V	
145		Flaws in manufacturer quality control process - Components of Wing control surface system.		V				V	
146		Aggressive maneuvering / overcontrolling		V					
147		Lack of adherence to SOP in terms of AFM limitations		V					
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					
150		Flaws in manufacturer quality control process - Integrity of primary aircraft structure.		V					
151		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		V					
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		V					
157		Incorrect use of automation -Engine anti-ice system		V					
158		Flaws in manufacturer quality control process - Fuel system components.		V					
159		Unintuitive and / or error prone system manual - Engine anti-icing system		V					
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.		V					
162		Flaws in aircraft system maintenance process definition - Reduction gear in the engine.		V					
163		Lack of adherence to emergency procedures - Fuel starvation		V					
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		V					
166		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance		V					

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
		with requirements - Compressor in the engine							
167		Flaws in manufacturer quality control process - Compressor in the engine.		V					
168		Flaws in aircraft system maintenance process definition - Compressor in the engine.		V					
169		Flaws in manufacturer quality control process - Engine accessory drive components.		V					
170		Flaws in aircraft system maintenance process definition - Engine accessory drive components.		V					
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.		V					
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.		V					
176		Flaws in manufacturer quality control process - Landing gear components.		V					
177		Flaws in aircraft system maintenance process definition - Landing gear components.		V					
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		V					
187		Flaws in manufacturer quality control process - Engine turbine components		V					
188		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components		V				V	
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		V				V	

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
191		Lack of adherence to AFM in terms of emergency procedures - engine restart procedure		V					
192		Flaws in manufacturer quality control process - APU systems and / or components		V					
193		Lack of adherence to SOP in terms of awareness on supporting systems warning		V					
194		Unintuitive and / or error prone system manual - ECAM		V					
195		Flaws in manufacturer quality control process - Engine sensors		V					
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		V					
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						V	
200		Excessive pitch attitude		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		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		V				V	
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				V	
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.						V	
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.)						V	
215		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine						V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
216		Navigation deviation					V	
217		Flaws in manufacturer quality control process - Autothrottle system in the engine.					V	
218		Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.					V	
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					V	
221		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)					V	
222		Flaws in aircraft system maintenance process definition - Fire detection system components					V	
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					V	
225		Flaws in aircraft system maintenance process definition - Fire warning system					V	
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					V	
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					V	
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					V	
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					V	
235		Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.					V	
236		Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.					V	
237		Flaws in aircraft system maintenance process definition - TOCW System					V	
238		Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing					V	
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)					V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			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					V	
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					V	
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		V				
250		Flaws in aircraft system maintenance process definition - FCS systems or components		V				
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					V	
253		Lack of adherence to SOP in terms of awareness on supporting systems warning - stickshaker					V	
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					V	
256		Error in calculation of necessary amount of fuel		V				
257		Lack of adherence to the current technology standards in terms of flight safety and efficiency - engines location.		V				
258		Lack of adherence to AFM in terms of emergency procedures - engine failure		V				
259		Inadequate stall recovery procedure for the aircraft					V	
260		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment					V	
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					V	
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					V	
265		Flaws in aircraft system maintenance process definition - Engine systems and / or components		V				

No.	Safety Performance Indicators	Precursors	Operational issue					
			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			V	V
133		Pilot tiredness - Inadequate workload distribution	V	V			V	V
134		Flaws in pilot requirements definition process and/or training methodology	V	V			V	V
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					V	V
137		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.		V			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	V	V			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		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 components		V				
142		Flaws in manufacturer quality control process - Engine systems and / or components		V			V	
143		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		V			V	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			V	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			V	
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	

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
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		V			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			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				V
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				V
162		Lack of adherence to emergency procedures - control recovery		V				V
163		Flaws in aircraft system maintenance process definition - Engine systems and / or components		V			V	
164		Flaws in manufacturer quality control process - APU systems and / or components		V				
165		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					V	
166		Lack of adherence to SOP in terms of fuelling procedure		V				
167		Lack of adherence to SOP in terms of approach and landing		V				V
168		Flaws in aircraft system maintenance process definition - Electrical wiring System		V				
169		Lack of adherence to regulations concerning transport of DGR goods		V				
170		Separation of structural element / component of the aircraft during take-off or landing		V				
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		V				
174		Inadequate aircraft de-icing / anti-icing		V			V	
175		Poor application of T/O & RTO procedure, failure recognition and preparedness					V	
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				

No.	Safety Performance Indicators	Precursors	Operational issue						
			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.		V				V	
179		Flaws in manufacturer quality control process - Components of Wing control surface system.		V				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 - Fire extinguishing system components		V				V	
182		Flaws in manufacturer quality control process - Landing gear components.		V					
183		DME / ILS DME confusion in assessing the final descent point / FAF		V					V
184		Flaws in aircraft system maintenance process definition - Fire extinguishing system components		V				V	
185		Flaws in manufacturer quality control process - Fire extinguishing system components		V				V	
186		Lack of or poor communication quality	V					V	
187		Flaws in CRM training procedures		V				V	V
188		Lack of adherence to the main CRM rules		V				V	V
189		Traffic controller tiredness - Inadequate workload distribution	V					V	V
190		Flaws in traffic controller requirements definition process and/or training methodology	V					V	V
191		Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing		V					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 in the case of adverse weather.		V					V
194		Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure		V					V
195		Incorrect use of automation - FMS		V					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						V	
198		Unintuitive and / or error prone system manual - FMS		V					V
199		Lack of adherence to AFM limitations for landing		V					V
200		Descent above desired descent profile		V					V
201		Inadequate de-icing method applied		V					

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
202		Incorrect use of automation -Engine anti-ice system		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					
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.		V					
210		Flaws in aircraft system maintenance process definition - ECAM (or similar) system components.		V					
211		Unintuitive and / or error prone system manual - Engine anti-icing system		V					
212		Lack of adherence to the SOP in terms of critical indicators cross-checking		V					
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.		V					
215		Lack of adherence to SARPs in terms of avoiding adverse weather conditions during flight		V					
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.		V					
219		Flaws in manufacturer quality control process - Integrity of primary aircraft structure.		V					
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.		V					
223		Flaws in manufacturer quality control process - ECAM (or similar) system components.		V					
224		Lack of adherence to emergency procedures - Fuel starvation		V					
225		Flaws in manufacturer quality control process - Fuel system components.		V					
226		Tailwind component above limit							V

No.	Safety Performance Indicators	Precursors	Operational issue						
			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					
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					
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					
233		Lack of adherence to AFM in terms of emergency procedures - fire detection and extinguishing procedure		V					
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 airtaxi and airport topology.	V				V		
239		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	V				V		
240		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airtaxi or / and aircraft / vehicle proximity	V				V		
241		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	V				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 effectiveness of fire extinguishing system		V					
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						

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
252		Slow rotation (i.e., low pitch rate)					V	
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					V	
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					V	
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.					V	
273		Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.					V	
274		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)					V	
275		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components					V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			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.					V	
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					V	
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					V	
291		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.					V	
292		Poor application of T/O & RTO procedure, computation of T/O parameters					V	
293		Late rejected takeoff decision / initiation					V	
294		Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations					V	
295		Failure to remember / assess crosswind component limit for prevailing runway condition					V	V
296		Lack of adherence to the current technology standards in terms of flight safety and efficiency - engines location.		V				
297		Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots					V	
298		Takeoff without clearance					V	
299		Landing without clearance					V	
300		Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings					V	

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
301		Late activation of pedal braking or takeover from autobrake, when so required							V
302		Delayed selection of reverse thrust							V
303		Inappropriate selection of autobrake mode for given runway length and condition							V
304		Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling						V	
305		Lack of adherence to AFM limitations for Take-off						V	
306		Unintuitive and / or error prone system manual - FMC						V	
307		Undetected incorrect takeoff configuration						V	
308		Lack of adherence to Rules of the Air - adherence to Controller clearance						V	
309		Flaws in Airspace and Air Traffic planning procedures design process						V	
310		Taxiing without clearance		V					
311		Flaws in airport capacity management process						V	
312		Lack of adherence to SOP for take-off procedure in terms of time limitation for take-off preparation.						V	
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		V					
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		V					
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						V	
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						V	
135		Navigation deviation						V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
136		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components					V	
137		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.					V	
138		Flaws in manufacturer quality control process - Onboard navigational systems and components.					V	
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					V	
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.					V	
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.					V	
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					V	
158		Flaws in aircraft system maintenance process definition - APU systems and / or components					V	
159		Flaws in aircraft system maintenance process definition - Fire detection system components					V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			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					V	
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					V	
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					V	
172		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment					V	
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 maintenance - 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	V
134		Flaws in pilot requirements definition process and/or training methodology	V	V			V	V
135		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.		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			V	V
137		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance		V			V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			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		V			V	
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			V	
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 components		V				
143		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		V			V	
144		Inadequate aircraft de-icing / anti-icing		V			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.		V			V	
148		Aggressive maneuvering / overcontrolling		V				V
149		Lack of adherence to SOP in terms of AFM limitations		V				
150		Lack of adherence to the SOP in terms of critical indicators cross-checking		V				
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.		V				
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		V			V	
155		Lack of adherence to SARPs in terms of avoiding adverse weather conditions during flight		V				
156		Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.		V				
157		Flaws in aircraft system maintenance process definition - Engine systems and / or components		V			V	
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		V				
160		Flaws in aircraft system maintenance process definition - Engine anti-ice system and / or components		V				
161		Incorrect use of automation -Engine anti-ice system		V				

No.	Safety Performance Indicators	Precursors	Operational issue						
			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.		V					
164		Flaws in aircraft system maintenance process definition - Reduction gear in the engine.		V					
165		Flaws in manufacturer quality control process - Fuel system components.		V					
166		Inadequate de-icing method applied		V					
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					
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		Flaws in aircraft system maintenance process definition - Oil distribution system		V					
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		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		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		V					
179		Lack of adherence to SOP in terms of de-icing / anti-icing procedures.		V					
180		Flaws in manufacturer quality control process - ECAM (or similar) system components.		V					
181		Lack of adherence to emergency procedures - Fuel starvation		V					
182		Flaws in manufacturer quality control process - Landing gear components.		V					
183		Flaws in aircraft system maintenance process definition - Landing gear components.		V					
184		Flaws in manufacturer quality control process - APU systems and / or components		V					
185		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ECAM.		V					
186		Flaws in aircraft system maintenance process definition - Engine combustor		V					

No.	Safety Performance Indicators	Precursors	Operational issue						
			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		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		V					
191		Flaws in manufacturer quality control process - Engine turbine components		V					
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		V				V	
198		Flaws in manufacturer quality control process - Fire detection system components		V				V	
199		Flaws in aircraft system maintenance process definition - Fire warning system		V				V	
200		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system		V				V	
201		Flaws in manufacturer quality control process - Fire warning system		V				V	
202		Lack of adherence to AFM limitations for Take-off		V				V	
203		Flaws in aircraft system maintenance process definition - Electrical wiring System		V					
204		Lack of adherence to regulations concerning transport of DGR goods		V					
205		Lack of adherence to engine limitations		V					
206		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Electrical / wiring system components		V					
207		Flaws in manufacturer quality control process - Electrical / wiring systems components		V					
208		Lack of adherence to SOP in terms of fuelling procedure		V					
209		Inadequate maintenance of fire vulnerable aircraft parts or components		V					
210		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements in terms of fire resistance		V					

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
211		Separation of structural element / component of the aircraft during take-off or landing		V					
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				V	
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					
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.)		V				V	
233		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)		V				V	
234		Lack of adherence to AFM in terms of emergency procedures - fire detection and extinguishing procedure		V					
235		Traffic controller tiredness - Inadequate workload distribution	V					V	V

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
236		Flaws in traffic controller requirements definition process and/or training methodology	V				V	V
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					V	
239		Lack of English proficiency	V				V	
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 airtaxi and airport topology.	V				V	
244		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	V				V	
245		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airtaxi or / and aircraft / vehicle proximity	V				V	
246		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	V				V	
247		Inadequate effectiveness of fire extinguishing system		V				
248		Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations					V	
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					
252		Lack of adherence to SOP for GND movements.	V					
253		Current airport diagram not reflecting critical changes	V					
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		V				
259		Flaws in aircraft system maintenance process definition - Engine fuel distribution system		V				
260		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components					V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
261		Flaws in manufacturer quality control process - Power supply system components					V	
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				
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	V					
273		Lack of adherence to SOP in terms of load sheet preparation and verification		V				
274		Lack of adherence to the current technology standards in terms of flight safety and efficiency - fuel tank allocation.		V				
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		V				
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.		V				
282		Flaws in manufacturer quality control process - Rudder components.		V				
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.		V				
285		Flaws in manufacturer quality control process - Horizontal stabilizer components.		V				

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
286		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment					V	
287		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.					V	
288		Error in calculation of necessary amount of fuel		V				
289		Lack of adherence to SOP in terms of approach and landing		V				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					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 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				V
296		Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure		V				V
297		Incorrect use of automation - FMS		V				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				V
299		Lack of adherence to emergency procedures - recovery from severe FCS failure		V				
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, ...)						V
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		V				
303		Unintuitive and / or error prone system manual - FMS		V				V
304		Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots					V	
305		Takeoff without clearance					V	
306		Landing without clearance					V	
307		Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings					V	
308		Lack of adherence to emergency procedures - WEM						V
309		Late activation of pedal braking or takeover from autobrake, when so required						V
310		Delayed selection of reverse thrust						V
311		Inappropriate selection of autobrake mode for given runway length and condition						V

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
312		Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.					V	
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					V	
320		Undetected incorrect takeoff configuration					V	
321		Lack of adherence to Rules of the Air - adherence to Controller clearance					V	
322		Flaws in manufacturer quality control process - PWS system components						V
323		Flaws in Airspace and Air Traffic planning procedures design process					V	
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					V	
327		Lack of adherence to SOP for take-off procedure in terms of time limitation for take-off preparation.					V	
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

No.	Safety Performance Indicators	Precursors	Operational issue					
			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	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		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	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			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 - 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 airtaxi 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 detection system components		V			V	
149		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airtaxi or / and aircraft / vehicle proximity	V				V	
150		Landing without clearance	V				V	

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
151		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - 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		V				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				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 / clearance	V					V	
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 components		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		V					

No.	Safety Performance Indicators	Precursors	Operational issue					
			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					
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 omitted	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				V	
194		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		V			V	
195		Inadequate effectiveness 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					V	
199		Lack of adherence to the main CRM rules					V	
200		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.					V	
201		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.					V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
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					V	
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.)					V	
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					V	
214		Navigation deviation					V	
215		Flaws in Airspace and Air Traffic planning procedures design process					V	
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.					V	
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					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					
225		Late rejected takeoff decision / initiation					V	
226		Lack of adherence to emergency procedures - RWY collision avoidance	V					

No.	Safety Performance Indicators	Precursors	Operational issue						
			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.		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 manoeuvre execution - flare		V					
238		Extreme operation condition / poor maintenance quality / advanced life length		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		V					
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						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		Inadequate management / separation of takeoffs and landings	V						
131	Rate of taxiway incursions/flight	Pilot tiredness - Inadequate workload distribution	V	V					

No.	Safety Performance Indicators	Precursors	Operational issue					
			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				
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	V				
140		Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airtaxi and airport topology.	V					
141		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	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 airtaxi 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					

No.	Safety Performance Indicators	Precursors	Operational issue					
			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 omitted	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	V					
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.	V					
166		Lack of adherence to ICAO Annex 14 and related documents in terms of airside lights distribution	V					
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 manoeuvre execution - flare		V				
176		Extreme operation condition / poor maintenance quality / advanced life length		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				

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
182		Incorrect use of automation - CPCS		V				
183		Unintuitive and / or error prone system manual - CPCS		V				
184		Inadequate stall recovery procedure for the aircraft	V					
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		V			V	V
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		V			V	V
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 maintenance - 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		V			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		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.		V			V	
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	
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				

No.	Safety Performance Indicators	Precursors	Operational issue					
			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		V				
155		Flaws in aircraft system maintenance process definition - Fuel system components		V				
156		Flaws in manufacturer quality control process - Fuel system components.		V				
157		Unintuitive and / or error prone system manual - CPCS		V			V	V
158		Flaws in manufacturer quality control process - Landing gear components.		V				
159		Flaws in aircraft system maintenance process definition - Landing gear components.		V				
160		Unintuitive and / or error prone system manual - FMS		V				V
161		Incorrect use of automation - FMS		V				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		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		V				
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		V				
171		Flaws in manufacturer quality control process - Compressor in the engine.		V				
172		Flaws in aircraft system maintenance process definition - Compressor in the engine.		V				
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				

No.	Safety Performance Indicators	Precursors	Operational issue						
			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		V					
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.		V					
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					V
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		V					
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		V					
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					V
193		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path		V					V
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.		V					V
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					V
197		Lack of adherence to the main CRM rules		V					V
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.		V					V
199		Lack of adherence to emergency procedures - control recovery		V					V
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	
202		Unintuitive and / or error prone system manual - FMC						V	
203		Incorrect stab-trim setting						V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
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		V				
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	
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		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, ...)		V				V
219		Late deceleration and configuration set-up for approach and landing		V				V
220		Unstabilized final approach (high, fast, steep, ...)		V				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.)		V			V	
223		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)		V			V	
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.		V			V	
226		Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.		V			V	
227		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)		V			V	
228		Lack of adherence to AFM in terms of emergency procedures - engine restart procedure		V				

No.	Safety Performance Indicators	Precursors	Operational issue					
			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		V				
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		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		V				
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.		V			V	
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			V	
243		Flaws in aircraft system maintenance process definition - Electrical wiring System		V			V	
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		V				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		V				
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					V	
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 manoeuvre execution		V				

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
255		Applied de-icing / anti-icing method is not sufficient for predicted conditions		V				V	
256		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System						V	
257		Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination		V					
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		V					
265		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ADI		V					
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		V					
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		V					
277		Lack of adherence to SOP in terms of AFM limitations in terms of weigh and balance		V					
278		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PFD		V					

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
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			V	
282		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - stickshaker system components		V			V	
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		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					V	
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					V	
303		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components					V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
304		Flaws in aircraft system maintenance process definition - Fire extinguishing system components					V	
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.					V	
310		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.					V	
311		Flaws in manufacturer quality control process - Communication equipment systems and components.					V	
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.		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		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.					V	
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			V	V

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
329		Lack of adherence to SOP in terms of pre-flight inspections - ice presence on aircraft		V				
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		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					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		V				
346		Lack of adherence to SOP for GND movements.		V				
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 manoeuvre 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				
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

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
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			V	
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					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		V				
365		Inadequate stall recovery procedure for the aircraft					V	
366		Unintuitive and / or error prone system manual - ground radar.					V	
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		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		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		V			V	V
136		Aggressive maneuvering / overcontrolling		V				V
137		Inadequate aircraft de-icing / anti-icing		V			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		V				V
140		Incorrect use of automation - FMS		V				V
141		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		V			V	V

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
142		Flaws in CRM training procedures		V			V	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.		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.		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		V				V
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.		V			V	
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.		V				
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 maintenance - 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		V				
165		Flaws in aircraft system maintenance process definition - Fuel system components		V				
166		Flaws in manufacturer quality control process - Landing gear components.		V				

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
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					
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		V					
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.		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		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		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.		V					
186		Flaws in manufacturer quality control process - ECAM (or similar) system components.		V					
187		Lack of adherence to emergency procedures - Fuel starvation		V					
188		Inadequate de-icing method applied		V					
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					
191		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components		V					

No.	Safety Performance Indicators	Precursors	Operational issue					
			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		V				
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		V				
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		V			V	
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		V				
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, ...)		V				V
209		Late deceleration and configuration set-up for approach and landing		V				V
210		Unstabilized final approach (high, fast, steep, ...)		V				V
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					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			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		V				

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
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.)		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			V	
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			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				V
225		DME / ILS DME confusion in assessing the final descent point / FAF		V				V
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		V				
229		Lack of adherence to SOP in terms of safety best practices		V				
230		Go-around attempt after thrust reversers deployment		V				V
231		Lack of adherence to SOP in terms of aircraft icing (condition) monitoring		V				
232		Lack of adherence to AFM limitations for landing		V				V
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 manoeuvre 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				
242		Lack of adherence to SOP in terms of pre-flight inspections -presence of anti-contamination covers on pitot static tube		V				

No.	Safety Performance Indicators	Precursors	Operational issue					
			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		V				
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		V				
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		V				
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		V				
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		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						V
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		V				

No.	Safety Performance Indicators	Precursors	Operational issue					
			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					V	
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	
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					V	
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					V	
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					V	
284		Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airtsite and airport topology.					V	
285		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance					V	
286		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airtsite or / and aircraft / vehicle proximity					V	
287		Takeoff without clearance					V	
288		Landing without clearance					V	
289		Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings					V	
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				

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
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.						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					
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.		V					
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.		V					
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		V					
315		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - On-board weather radar		V					
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					
318		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components						V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			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.					V	
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						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	V
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					V	
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				V
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		V				V
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					V	
342		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.					V	
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		V				V

No.	Safety Performance Indicators	Precursors	Operational issue					
			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		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		V				
350		Flaws in manufacturer quality control process - Electrical / wiring systems components		V				
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		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			V
139		Aggressive maneuvering / overcontrolling		V				V
140		Flaws in CRM training procedures		V	V			V
141		Lack of adherence to the main CRM rules		V	V			V
142		Lack of adherence to the SOP in terms of critical indicators cross-checking		V	V			
143		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - 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		V				
145		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		V			V	V
146		Flaws in aircraft system maintenance process definition - Fuel system components		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		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components		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

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
150		Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing		V					V
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.		V					V
152		Flaws in manufacturer quality control process - Engine systems and / or components		V					
153		Inadequate aircraft de-icing / anti-icing		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.		V					
155		Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.		V					
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.		V				V	
158		Flaws in aircraft system maintenance process definition - Components of Wing control surface system.		V				V	
159		Flaws in manufacturer quality control process - Components of Wing control surface system.		V				V	
160		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	
161		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring		V					
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					V
167		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components		V				V	
168		Flaws in aircraft system maintenance process definition - APU systems and / or components		V				V	
169		Lack of adherence to SOP in terms of AFM limitations		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		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				
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		V					

No.	Safety Performance Indicators	Precursors	Operational issue					
			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.			V		V	
178		Flaws in manufacturer quality control process - Onboard navigational systems and components.			V		V	
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		V				
182		Flaws in manufacturer quality control process - Engine anti-ice system and / or components		V				
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		V				
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		V				
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		V				
192		Flaws in manufacturer quality control process - Compressor in the engine.		V				
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.		V				
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.		V				
199		Unintuitive and / or error prone system manual - Engine anti-icing system		V				

No.	Safety Performance Indicators	Precursors	Operational issue					
			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		V				
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 immediate 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 clearance 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	

No.	Safety Performance Indicators	Precursors	Operational issue					
			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				V
232		Flaws in manufacturer quality control process - Fire warning system		V				V
233		Flaws in aircraft system maintenance process definition - Electrical wiring System		V				
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		V				
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 inappropriate 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, ...)		V				V
247		Late deceleration and configuration set-up for approach and landing		V				V
248		Unstabilized final approach (high, fast, steep, ...)		V				V
249		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components		V				V

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
250		Flaws in aircraft system maintenance process definition - Fire extinguishing system components		V				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		V					
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		V					
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					V
262		Lack of adherence to AFM limitations for landing		V					V
263		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine		V				V	
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 effectiveness of fire extinguishing system		V					
267		Unintuitive and / or error prone system manual - fire extinguishing system		V					
268		Excessive pitch attitude		V					
269		Excessive bank angle		V					
270		Lack of adherence to the SOP in terms of critical manoeuvre execution		V					
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		V					
274		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ADI system components		V					
275		Flaws in manufacturer quality control process - ADI system components		V					
276		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance						V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			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.					V	
280		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.					V	
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		V				
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					V	
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.		V				
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.		V				
299		Flaws in aircraft system maintenance process definition - Horizontal stabilizer components.		V				
300		Flaws in manufacturer quality control process - Horizontal stabilizer components.		V				
301		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance		V				

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
		with requirements - Thrust reverse system in the engine.						
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 manoeuvre execution - flare		V				
306		Extreme operation condition / poor maintenance quality / advanced life length		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		V			V	V
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)			V			
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			V			
314		Late or inadequate response to MSAW warning			V			
315		Failure to go-around, when so required			V			
316		Failure to follow published missed-approach procedure			V			
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			V			
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 immediate answer on supporting systems warning. MSAW warning.			V			
322		Late activation of pedal braking or takeover from autobrake, when so required		V				V
323		Delayed selection of reverse thrust		V				V
324		Late thrust reduction or power-on touchdown		V				V
325		Failure to arm ground-spoilers		V				V
326		Inappropriate selection of autobrake mode for given runway length and condition		V				V
327		Use of non-standard phraseology by pilot flying (PF) and/or pilot not flying (PNF)		V				

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
328		Lack of adherence to SOP in terms of necessary amount of fuel		V					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		V					
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		V					
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			V				
340		Flaws in manufacturer quality control process - GPWS system components			V				
131	Rate of deviation from glideslope/approach	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		V	V				V
136		Incorrect use of automation - FMS		V	V				V
137		Unintuitive and / or error prone system manual - FMS		V	V				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	V				
140		Flaws in CRM training procedures		V	V				V
141		Lack of adherence to the main CRM rules		V	V				V
142		Aggressive maneuvering / overcontrolling		V					V
143		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.		V					
144		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance		V					

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
		with requirements - Fuel system components						
145		Flaws in aircraft system maintenance process definition - Fuel system components		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			V
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		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 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		V				V
151		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		V				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).		V	V			V
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			V
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.		V				
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				V
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.		V				
166		Flaws in manufacturer quality control process - Landing gear components.		V				
167		Flaws in aircraft system maintenance process definition - Landing gear components.		V				
168		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		V				

No.	Safety Performance Indicators	Precursors	Operational issue						
			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.		V					
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		V					
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		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.)		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		V					
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		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.		V					
184		Flaws in manufacturer quality control process - Engine accessory drive components.		V					
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.		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		V					
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					

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
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		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.)		V	V				
199		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components		V					
200		Flaws in manufacturer quality control process - APU systems and / or components		V					
201		Flaws in aircraft system maintenance process definition - APU systems and / or components		V					
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		V					
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			V				
210		Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. Navigational aid failure.			V				
211		Not recognized ground NavAids System failure not reflected in NOTAM messages			V				
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.			V				
217		Lack of English proficiency			V				
218		Use of non-standard phraseology by pilot and/or controller			V				

No.	Safety Performance Indicators	Precursors	Operational issue					
			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 clearance 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		V				
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		V				
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		V				
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, ...)		V				V
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		V				
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.		V				
243		Imbalanced and inappropriate relation between cpt and his subordinates			V			

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
244		Flaws in aircraft system maintenance process definition - Fire detection system components		V				
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				
249		Descent above desired descent profile		V				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				
254		Flaws in manufacturer quality control process - Engine sensors		V				
255		Flaws in aircraft system maintenance process definition - Engine sensors		V				
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				
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						V
263		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System.						V
264		Inadequate effectiveness of fire extinguishing system		V				
265		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system						V
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.						V
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				

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
270		Unintuitive and / or error prone system manual - CPCS							V
271		Excessive pitch attitude		V					
272		Excessive bank angle		V					
273		Lack of adherence to the SOP in terms of critical manoeuvre 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		V					
278		Flaws in manufacturer quality control process - ADI system components		V					
279		Lack of adherence to emergency procedures - WEM							V
280		Tailwind component above limit							V
281		Error in calculation of necessary amount of fuel		V					V
282		Flight below maneuvering speeds		V					
283		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Rudder components.		V					
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.		V					
287		Flaws in aircraft system maintenance process definition - Horizontal stabilizer components.		V					
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		V					
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.		V					
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.		V					
294		Flaws in aircraft system maintenance process definition - Thrust reverse system in the engine.		V					
295		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice		V					V

No.	Safety Performance Indicators	Precursors	Operational issue						
			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			V				
307		Lack of adherence to the current technology standards in terms of flight safety and efficiency - engines location.		V					
308		Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. MSAW warning.			V				
309		Late activation of pedal braking or takeover from autobrake, when so required		V					V
310		Delayed selection of reverse thrust		V					V
311		Late thrust reduction or power-on touchdown		V					V
312		Failure to arm ground-spoilers		V					V
313		Inappropriate selection of autobrake mode for given runway length and condition		V					V
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		V					
320		Flaws in manufacturer quality control process - Engine fuel distribution system		V					
321		Flaws in aircraft system maintenance process definition - Engine fuel distribution system		V					

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
322		Incorrect or confusing / misleading ATC instructions			V			
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			V			
328		Flaws in manufacturer quality control process - GPWS system components			V			
131	Rate of deviation from localizer/approach	Pilot tiredness - Inadequate workload distribution		V	V			V
132		Flaws in pilot requirements definition process and/or training methodology		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
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		V	V			V
137		Incorrect use of automation - FMS		V	V			V
138		Unintuitive and / or error prone system manual - FMS		V	V			V
139		Flaws in CRM training procedures		V	V			V
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		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
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		V				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 - Landing gear components		V				V
148		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.		V				

No.	Safety Performance Indicators	Precursors	Operational issue						
			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					V
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.		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		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					V
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		V					
161		Flaws in aircraft system maintenance process definition - Fuel system components		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		V					
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		V					
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		V					
174		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Compressor in the engine		V					

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
175		Flaws in manufacturer quality control process - Compressor in the engine.		V					
176		Flaws in aircraft system maintenance process definition - Compressor in the engine.		V					
177		Flaws in manufacturer quality control process - Engine accessory drive components.		V					
178		Flaws in aircraft system maintenance process definition - Engine accessory drive components.		V					
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.		V					
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					
186		Flaws in manufacturer quality control process - Components of Wing control surface system.		V					
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		V					
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		V					
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		V					
196		Flaws in aircraft system maintenance process definition - Engine combustor		V					
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		V					
199		Flaws in aircraft system maintenance process definition - Engine turbine components		V					

No.	Safety Performance Indicators	Precursors	Operational issue					
			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				
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 immediate 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			V			
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).			V			
217		Altimeter setting error			V			
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 clearance 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			V			
222		Imbalanced and inappropriate 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		V				

No.	Safety Performance Indicators	Precursors	Operational issue					
			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		V				
228		Unintuitive and / or error prone system manual - ECAM		V				
229		Descent above desired descent profile		V				V
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				V
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		V				
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		V				
237		Go-around attempt after thrust reversers deployment		V				V
238		Lack of adherence to AFM limitations for landing		V				V
239		Error in calculation of necessary amount of fuel		V				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				

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
252		Lack of adherence to SOP. Lack of awareness and immediate 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				V
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			V			
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	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		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		V
136		Lack of adherence to SOP in terms of approach and landing		V	V			V
137		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.		V			V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
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		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		V			V	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		V				V
145		Lack of adherence to the SOP in terms of critical indicators cross-checking		V	V			
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.)		V	V	V	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 components		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		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.		V	V			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	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				V
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		

No.	Safety Performance Indicators	Precursors	Operational issue					
			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.		V			V	
169		Flaws in aircraft system maintenance process definition - Components of Wing control surface system.		V			V	
170		Flaws in manufacturer quality control process - Components of Wing control surface system.		V			V	
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				V
173		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Integrity of primary aircraft structure.		V				
174		Flaws in manufacturer quality control process - Integrity of primary aircraft structure.		V				
175		Flaws in manufacturer quality control process - Fuel system components.		V				
176		Lack of adherence to emergency procedures - control recovery		V				V
177		Lack of adherence to SARPs in terms of avoiding adverse weather conditions during flight		V				
178		Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.		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		V			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		V				
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		V				
188		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Reduction gear in the engine		V				

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
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 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		V				
193		Flaws in manufacturer quality control process - Compressor in the engine.		V				
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				
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.		V				
199		Lack of adherence to emergency procedures - Fuel starvation		V				
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		V				
202		Flaws in manufacturer quality control process - Oil distribution system		V				
203		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.			V		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		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				
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		V				
213		Flaws in manufacturer quality control process - Engine combustor		V				

No.	Safety Performance Indicators	Precursors	Operational issue					
			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		V				
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 immediate 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).			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		Lack of adherence to SOP for AIR operations in terms of controller error in approach clearance instruction			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		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.				V	V	
231		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.				V	V	
232		Flaws in manufacturer quality control process - Communication equipment systems and components.				V	V	
233		Navigation deviation				V	V	
234		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire detection system components		V			V	
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			V	
237		Flaws in aircraft system maintenance process definition - Fire warning system		V			V	
238		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance		V			V	

No.	Safety Performance Indicators	Precursors	Operational issue						
			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					
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		V					
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 omitted					V		
252		Lack of adherence to SOP for take-off procedure in terms of altimeter calibration.					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					V		
262		Flaws in conflict and separation minima infringement detection / elimination procedures					V		
263		Lack of adherence of airlines to time constraints 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		

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
		with requirements - MTCO System							
265		Lack of adherence of airlines to declared Flight Plan.				V			
266		Failure to identify the pre-tactical conflict before it reach the tactical controller				V			
267		Lack of adherence to SOP for Airborne operation in terms of minimum separation				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			
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.		V					
273		Imbalanced and inappropriate 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, ...)		V					V
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			V		
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					V		
282		Lack of adherence to SOP in terms of awareness on supporting systems warning		V					
283		Unintuitive and / or error prone system manual - ECAM		V					
284		Descent above desired descent profile		V					V
285		DME / ILS DME confusion in assessing the final descent point / FAF		V					V
286		Flaws in manufacturer quality control process - Engine sensors		V					
287		Flaws in aircraft system maintenance process definition - Engine sensors		V					
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			V		

No.	Safety Performance Indicators	Precursors	Operational issue						
			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					V		
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					V
297		Lack of adherence to AFM limitations for landing		V					V
298		Inadequate effectiveness of fire extinguishing system		V					
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		V					
303		Lack of adherence to AFM limitations for Take-off		V					
304		Lack of adherence to SOP in terms of AFM limitations in terms of weigh and balance		V					
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		V					V
313		Tailwind component above limit							V
314		Flight below maneuvering speeds		V					
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	V

No.	Safety Performance Indicators	Precursors	Operational issue					
			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.		V				
317		Flaws in aircraft system maintenance process definition - Rudder components.		V				
318		Flaws in manufacturer quality control process - Rudder components.		V				
319		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Horizontal stabilizer components.		V				
320		Flaws in aircraft system maintenance process definition - Horizontal stabilizer components.		V				
321		Flaws in manufacturer quality control process - Horizontal stabilizer components.		V				
322		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Thrust reverse system in the engine.		V				
323		Flaws in manufacturer quality control process - Thrust reverse system in the engine.		V				
324		Flaws in aircraft system maintenance process definition - Thrust reverse system in the engine.		V				
325		Long / floating flare						V
326		Poor application of T/O & RTO procedure, braking initiation sequence					V	
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			V			
337		Lack of adherence to the current technology standards in terms of flight safety and efficiency - engines location.		V				
338		Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. MSAW warning.			V			
339		Late activation of pedal braking or takeover from autobrake, when so required		V				V
340		Delayed selection of reverse thrust		V				V
341		Late thrust reduction or power-on touchdown		V				V

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
342		Failure to arm ground-spoilers		V					V
343		Inappropriate selection of autobrake mode for given runway length and condition		V					V
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				V			
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	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		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		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.		V				V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
140		Lack of English proficiency	V	V		V	V	
141		Lack of or poor communication quality	V			V	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	V	
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 components		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		V			V	V
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		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.		V				
155		Flaws in manufacturer quality control process - Integrity of primary aircraft structure.		V				
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		V			V	
163		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		V			V	
164		Inadequate aircraft de-icing / anti-icing		V			V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			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			V	
168		Flaws in manufacturer quality control process - Components of Wing control surface system.		V			V	
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.		V				
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			V	
178		Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airtaxi and airport topology.	V				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		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 omitted	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 / clearance	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				

No.	Safety Performance Indicators	Precursors	Operational issue						
			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.		V					
193		Flaws in manufacturer quality control process - Engine accessory drive components.		V					
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.		V					
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		V					
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		V					
204		Lack of adherence to SOP in terms of de-icing / anti-icing procedures.		V					
205		Flaws in manufacturer quality control process - ECAM (or similar) system components.		V					
206		Flaws in manufacturer quality control process - Fire extinguishing system components		V			V	V	
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		V					
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		V					

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
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 - FMS subsystems and components (autopilot incl.)		V		V	V	
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	V					
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	V	
223		Flaws in manufacturer quality control process - Communication equipment systems and components.				V	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		
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			V	
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	V					
232		Takeoff without clearance	V				V	
233		Landing without clearance	V				V	
234		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components		V			V	
235		Inadequate coordination between ATM centers and/or ATC sectors				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		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			V	
240		Flaws in manufacturer quality control process - Fire warning system		V			V	
241		Unintuitive and / or error prone system manual - CPCS		V			V	V

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
242		Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	V				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	V				V	
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 constraints 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				
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		V				
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		V				
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 calibration.				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		

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
268		Lack of adherence to SOP for Airborne operation in terms of minimum separation				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		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	V					
279		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ground radar at the airport.	V					
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		V				
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	V					
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				V
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		V				
292		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine sensors		V				

No.	Safety Performance Indicators	Precursors	Operational issue					
			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				V		
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		V			V	
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)	V					
305		Inadequate effectiveness 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	V	
311		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components					V	
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					V	
315		Flaws in airport capacity management process					V	
316		Unintuitive and / or error prone system manual - On-board weather radar.		V				
317		Incorrect use of automation - On-board weather radar		V				

No.	Safety Performance Indicators	Precursors	Operational issue					
			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.					V	
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.	V					
326		Error in calculation of necessary amount of fuel		V				V
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		V				
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		V				
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		V				
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 airside from TWR	V					
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	V
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.		V				
341		Flaws in aircraft system maintenance process definition - Rudder components.		V				

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
342		Flaws in manufacturer quality control process - Rudder components.		V				
343		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Horizontal stabilizer components.		V				
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.		V				
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 manoeuvre execution - flare		V				
352		Extreme operation condition / poor maintenance quality / advanced life length		V				
353		Incorrect use of automation - CPCS		V				
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		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment					V	
361		Poor application of T/O & RTO procedure, braking initiation sequence					V	
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					V	
366		Lack of adherence to emergency procedures - recovery from severe FCS failure		V				
367		Lack of adherence to AFM in terms of emergency procedures - engine failure		V				
368		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine fuel distribution system		V				

No.	Safety Performance Indicators	Precursors	Operational issue						
			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	V						
372		Inadequate management / separation of takeoffs and landings	V						
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				V			
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	V	V	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		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	V			V	
140		Unintuitive and / or error prone system manual - FMS		V	V			V	
141		Traffic controller tiredness - Inadequate workload distribution		V	V	V	V		
142		Flaws in traffic controller requirements definition process and/or training methodology		V	V	V	V		
143		Lack of adherence to the SOP in terms of critical indicators cross-checking		V	V				
144		Aggressive maneuvering / overcontrolling		V					V
145		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.		V				V	
146		Lack of or poor communication quality			V	V	V		

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
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		V				
151		Flaws in aircraft system maintenance process definition - Fuel system components		V				
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 - 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		V			V	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	V	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.		V	V			V
158		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path		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		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)			V	V	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		V				
163		Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing		V				V
164		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring		V			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.		V				
170		Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.		V				

No.	Safety Performance Indicators	Precursors	Operational issue					
			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				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.		V			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			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		V				
178		Flaws in manufacturer quality control process - Landing gear components.		V				
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			V	
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		V				
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		V				
188		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Reduction gear in the engine		V				
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	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				

No.	Safety Performance Indicators	Precursors	Operational issue						
			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.		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		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		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					
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		V					
213		Flaws in manufacturer quality control process - Engine combustor		V					
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		V					
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	V		
218		Failure to check navigation accuracy before approach			V				
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)			V				
220		Current airport diagram not reflecting critical changes			V				

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
221		Lack of adherence to SOP. Lack of awareness and immediate 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		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.				V	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	V	
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 clearance instruction			V			
231		Navigation deviation				V	V	
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		V			V	
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 detection system components		V			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		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			V	
240		Flaws in manufacturer quality control process - Fire warning system		V			V	
241		Hearback omitted				V		
242		Unintuitive and / or error prone system manual - CPCS		V			V	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		

No.	Safety Performance Indicators	Precursors	Operational issue					
			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		V				
249		Flaws in aircraft system maintenance process definition - Engine systems and / or components		V				
250		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Electrical / wiring system components		V				
251		Flaws in manufacturer quality control process - Electrical / wiring systems components		V				
252		Lack of adherence to SOP in terms of fuelling procedure		V				
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		V				
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 constraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data.				V		
268		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MTCDC 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				V		
271		Lack of adherence to SOP for Airborne operation in terms of minimum separation				V		

No.	Safety Performance Indicators	Precursors	Operational issue					
			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.		V				
273		Imbalanced and inappropriate 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		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		V				
278		Unintuitive and / or error prone system manual - ECAM		V				
279		Descent above desired descent profile		V				V
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		V				V
282		DME / ILS DME confusion in assessing the final descent point / FAF		V				V
283		Unstabilized final approach (high, fast, steep, ...)		V				V
284		Flaws in manufacturer quality control process - Engine sensors		V				
285		Flaws in aircraft system maintenance process definition - Engine sensors		V				
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 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				V
292		Lack of adherence to AFM limitations for landing		V				V
293		Inadequate effectiveness of fire extinguishing system		V				
294		Unintuitive and / or error prone system manual - fire extinguishing system		V				
295		Landing without clearance					V	
296		Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings					V	
297		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			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 airtaxi 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 / clearance					V	
305		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airtaxi 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		V				
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		V			V	V
320		Poor application of T/O & RTO procedure, failure recognition and preparedness					V	
321		Lack of adherence to emergency procedures - flight deck smoke procedure		V				
322		Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations					V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
323		Lack of adherence to the SOP in terms of critical manoeuvre execution - flare		V				
324		Extreme operation condition / poor maintenance quality / advanced life length		V				
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			V			
331		Late or inadequate response to MSAW warning			V			
332		Failure to go-around, when so required			V			
333		Failure to follow published missed-approach procedure			V			
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			V			
336		Lack of adherence to the current technology standards in terms of flight safety and efficiency - engines location.		V				
337		Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. MSAW warning.			V			
338		Late activation of pedal braking or takeover from autobrake, when so required		V				V
339		Delayed selection of reverse thrust		V				V
340		Late thrust reduction or power-on touchdown		V				V
341		Failure to arm ground-spoilers		V				V
342		Inappropriate selection of autobrake mode for given runway length and condition		V				V
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		V				V
348		Poor application of T/O & RTO procedure, computation of T/O parameters					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		V				

No.	Safety Performance Indicators	Precursors	Operational issue						
			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		V					
354		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ACAS system components				V			
355		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS			V				
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			
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	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
136		Lack of adherence to the SOP in terms of critical indicators cross-checking		V	V				
137		Lack of adherence to SOP in terms of approach and landing		V	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		V	V				V
141		Lack of adherence to the main CRM rules		V	V				V
142		Traffic controller tiredness - Inadequate workload distribution		V	V	V			
143		Flaws in traffic controller requirements definition process and/or training methodology		V	V	V			

No.	Safety Performance Indicators	Precursors	Operational issue						
			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 maintenance - presence of contaminations.		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	V	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 components		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 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		V					
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		V				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 SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.		V	V				V
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					
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 in the case of adverse weather.		V					V
165		Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.		V					
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		V					V
168		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent		V					V

No.	Safety Performance Indicators	Precursors	Operational issue					
			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.		V			V	
172		Flaws in aircraft system maintenance process definition - Components of Wing control surface system.		V			V	
173		Flaws in manufacturer quality control process - Components of Wing control surface system.		V			V	
174		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring		V				
175		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		V				
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		V				
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		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	
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		V	V			
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.		V				
192		Flaws in aircraft system maintenance process definition - Reduction gear in the engine.		V				

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
193		Inadequate de-icing method applied		V				
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.		V				
196		Flaws in aircraft system maintenance process definition - Compressor in the engine.		V				
197		Flaws in manufacturer quality control process - Engine accessory drive components.		V				
198		Flaws in aircraft system maintenance process definition - Engine accessory drive components.		V				
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				
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		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.		V				
206		Unintuitive and / or error prone system manual - Engine anti-icing system		V				
207		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ECAM.		V				
208		Flaws in manufacturer quality control process - ECAM (or similar) system components.		V				
209		Flaws in manufacturer quality control process - Fire extinguishing system components		V		V	V	
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		V				
213		Flaws in manufacturer quality control process - Engine combustor		V				
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		V				
216		Flaws in manufacturer quality control process - Engine turbine components		V				
217		Failure to check navigation accuracy before approach			V			

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
218		Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. Navigational aid failure.			V			
219		Incorrect or confusing / misleading ATC instructions		V		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).			V			
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.				V	V	
228		Flaws in manufacturer quality control process - Communication equipment systems and components.				V	V	
229		Lack of adherence to SOP for AIR operations in terms of controller error in approach clearance instruction			V			
230		Navigation deviation				V	V	
231		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components		V			V	
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 detection system components		V			V	
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		V			V	
238		Flaws in manufacturer quality control process - Fire warning system		V			V	
239		Hearback omitted				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		

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
243		Altitude deviation				V		
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		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		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		V				
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		V				
258		Lack of adherence to engine limitations		V				
259		Lack of adherence to SOP for take-off procedure in terms of altimeter calibration.				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 constraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data.				V		
268		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MTCD System				V		

No.	Safety Performance Indicators	Precursors	Operational issue					
			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 separation				V		
272		Flaws in manufacturer quality control process - Anti-icing system components		V				
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.		V				
275		Imbalanced and inappropriate 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			V	
277		Unintuitive and / or error prone system manual - CPCS		V			V	V
278		Flaws in aircraft system maintenance process definition - Fire extinguishing system components		V			V	
279		Lack of adherence to AFM in terms of emergency procedures - engine restart procedure		V				
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				V
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, ...)		V				V
285		Late deceleration and configuration set-up for approach and landing		V				V
286		DME / ILS DME confusion in assessing the final descent point / FAF		V				V
287		Unstabilized final approach (high, fast, steep, ...)		V				V
288		Flaws in manufacturer quality control process - Engine sensors		V				
289		Flaws in aircraft system maintenance process definition - Engine sensors		V				
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			V	
292		Flaws in manufacturer quality control process - Autothrottle system in the engine.		V			V	
293		Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.		V			V	
294		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of STCA System.				V		

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
295		Lack of adherence to regulations concerning independent ATCO monitoring				V		
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				V
301		Excessive pitch attitude		V				
302		Excessive bank angle		V				
303		Inadequate effectiveness 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		V				
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		V				
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		V				
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		V				
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				

No.	Safety Performance Indicators	Precursors	Operational issue						
			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		V					
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		V					
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		V					
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		V					
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						V	
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.		V					
343		Lack of adherence to SOP in terms of AFM limitations in terms of weigh and balance		V					
344		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Thrust reverse system in the engine.		V					
345		Flaws in manufacturer quality control process - Thrust reverse system in the engine.		V					

No.	Safety Performance Indicators	Precursors	Operational issue					
			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.		V				
367		Lack of adherence to emergency procedures - flight deck smoke procedure		V				
368		Lack of adherence to the SOP in terms of critical manoeuvre execution - flare		V				
369		Extreme operation condition / poor maintenance quality / advanced life length		V				
370		Incorrect use of automation - CPCS		V				
371		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice		V				V V

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
		presence / or runway surface friction rate below minimum							
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 immediate answer on supporting systems warning. MSAW warning.			v				
384		Late activation of pedal braking or takeover from autobrake, when so required		v					v
385		Delayed selection of reverse thrust		v					v
386		Late thrust reduction or power-on touchdown		v					v
387		Failure to arm ground-spoilers		v					v
388		Inappropriate selection of autobrake mode for given runway length and condition		v					v
389		Lack of adherence to SOP in terms of necessary amount of fuel		v					v
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						v	
393		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.						v	
394		Poor application of T/O & RTO procedure, computation of T/O parameters						v	
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		

No.	Safety Performance Indicators	Precursors	Operational issue					
			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				V		
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				V		
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			V			
403		Flaws in manufacturer quality control process - GPWS system components			V			
131	Rate of high speed rejected take-off/attempted take-off	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	V	V			V	
136		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - 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		V			V	
140		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		V			V	
141		Flaws in manufacturer quality control process - Engine systems and / or components		V			V	
142		Inadequate aircraft de-icing / anti-icing		V			V	
143		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fuel system components		V				
144		Flaws in aircraft system maintenance process definition - Fuel system components		V				
145		Lack of adherence to SOP in terms of de-icing / anti-icing procedures.		V			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			V	
147		Flaws in aircraft system maintenance process definition - Components of Wing control surface system.		V			V	
148		Flaws in manufacturer quality control process - Components of Wing control surface system.		V			V	

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
149		Unintuitive and / or error prone system manual - CPCS		V				V	
150		Traffic controller tiredness - Inadequate workload distribution	V	V				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	
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.		V					
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.		V					
165		Flaws in aircraft system maintenance process definition - Reduction gear in the engine.		V					
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		V					
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					

No.	Safety Performance Indicators	Precursors	Operational issue						
			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		V					
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					
180		Flaws in aircraft system maintenance process definition - ECAM (or similar) system components.		V					
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						V	
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		V					
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		V					
195		Flaws in manufacturer quality control process - Engine turbine components		V					
196		Lack of or poor communication quality	V					V	
197		Flaws in aircraft system maintenance process definition - Electrical wiring System		V				V	
198		Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.						V	
199		Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.						V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
200		Incorrect stab-trim setting					V	
201		Lack of English proficiency	V	V			V	
202		Incorrect or confusing / misleading ATC instructions	V	V			V	
203		Use of non-standard phraseology by pilot and/or controller	V	V			V	
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			V	
206		Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airtaxi and airport topology.	V				V	
207		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire detection 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			V	
210		Flaws in aircraft system maintenance process definition - Fire warning system		V			V	
211		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system		V			V	
212		Flaws in manufacturer quality control process - Fire warning system		V			V	
213		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airtaxi or / and aircraft / vehicle proximity	V				V	
214		Takeoff without clearance	V				V	
215		Landing without clearance	V				V	
216		Lack of adherence to AFM limitations for Take-off		V			V	
217		Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	V				V	
218		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	V				V	
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				V	
221		Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	V				V	
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		V				
225		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Electrical / wiring system components		V				

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
226		Flaws in manufacturer quality control process - Electrical / wiring systems components		V					
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						V	
228		Lack of adherence to SOP in terms of fuelling procedure		V					
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					
232		Lack of adherence to engine limitations		V					
233		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components		V				V	
234		Inadvertent deviation from cleared taxi route	V						
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						V	
244		Callsign confusion	V						
245		Unintuitive and / or error prone system manual - ground radar.	V					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 omitted	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						

No.	Safety Performance Indicators	Precursors	Operational issue						
			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					V		
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		
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		V					
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			V		
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			V		
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	V				V		
271		Slow rotation (i.e., low pitch rate)					V		
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					V		
275		Incorrect use of automation - TOCW System					V		

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
276		Flaws in aircraft system maintenance process definition - TOCW System					V	
277		Unintuitive and / or error prone system manual - TOCW					V	
278		Inadequate effectiveness of fire extinguishing system		V				
279		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System					V	
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		V				
284		Lack of adherence to SOP in terms of pre-flight inspections -presence of anti-contamination covers on pitot static tube		V				
285		Lack of adherence to SOP in terms of briefing and checklist before initiating of start of taxiing and take-off		V				
286		Lack of adherence to SOP for take-off procedure in terms of speed bug checklist preparation and verification.					V	
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		V				
289		Flaws in aircraft system maintenance process definition - PFD		V				
290		Unintuitive and / or error prone system manual - fire extinguishing system		V				
291		Excessive bank angle		V				
292		Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared		V				
293		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System.		V				
294		Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination		V				
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		V				
297		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.		V				
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				

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
301		Flaws in aircraft system maintenance process definition - Pitot static systems components		V				
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.					V	
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		V			V	
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					V	
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.		V				
326		Flaws in manufacturer quality control process - Rudder components.		V				

No.	Safety Performance Indicators	Precursors	Operational issue						
			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.		V					
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.						V	
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 - anti-ice fluid HOT						V	
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 airside 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						

No.	Safety Performance Indicators	Precursors	Operational issue						
			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					
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 manoeuvre 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		V					
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		V					
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						V	
374		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment		V					
375		Flaws in manufacturer quality control process - Stickshaker system components						V	
131	Rate of continued approach (go around not conducted) following unstabilised approach/approach	Pilot tiredness - Inadequate workload distribution	V	V	V			V	V

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
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		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	V	V		V	V
136		Incorrect use of automation - FMS		V	V			V
137		Unintuitive and / or error prone system manual - FMS		V	V			V
138		Flaws in CRM training procedures		V	V		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	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			V	V
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.		V	V			V
147		Lack of or poor communication quality	V		V		V	
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 maintenance - presence of contaminations.		V			V	V
154		Use of non-standard phraseology by pilot and/or controller	V		V		V	
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	

No.	Safety Performance Indicators	Precursors	Operational issue					
			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				V
160		Current airport diagram not reflecting critical changes	V		V			
161		Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure		V				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.		V			V	
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 components		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.)			V		V	
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		V				
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.			V		V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
182		Flaws in manufacturer quality control process - Onboard navigational systems and components.			V		V	
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				

No.	Safety Performance Indicators	Precursors	Operational issue					
			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		V				
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		V				
212		Flaws in manufacturer quality control process - Engine turbine components		V				
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)			V			
214		Failure to check navigation accuracy before approach			V			
215		Lack of adherence to SOP. Lack of awareness and immediate 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	V
220		Altimeter setting error			V			
221		Lack of adherence to SOP for AIR operations in terms of controller error in approach clearance instruction			V			
222		Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination			V			
223		Incorrect or confusing / misleading ATC instructions	V		V		V	
224		Landing without clearance	V				V	
225		Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	V				V	
226		Takeoff without clearance	V				V	
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				V	
229		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	V				V	
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	V				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	

No.	Safety Performance Indicators	Precursors	Operational issue						
			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 inappropriate 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 omitted	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

No.	Safety Performance Indicators	Precursors	Operational issue					
			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.						V
259		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system						V
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						V
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 manoeuvre 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		V				
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					V	
274		Lack of adherence to SOP for take-off procedure in terms of time limitation for take-off preparation.					V	
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					V	
277		Flaws in manufacturer quality control process - Power supply system components					V	
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.					V	
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	

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
283		Flaws in Airspace and Air Traffic planning procedures design process					V	
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.					V	
286		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components					V	
287		Flaws in aircraft system maintenance process definition - Hydraulic System					V	
288		Flaws in airport capacity management process					V	
289		Tailwind component above limit						V
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					V	
292		Flaws in manufacturer quality control process - Fire detection system components					V	
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					V	
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					V	
297		Flaws in aircraft system maintenance process definition - Fire extinguishing system components					V	
298		Flaws in manufacturer quality control process - Fire extinguishing system components					V	
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			V	V
301		Error in calculation of necessary amount of fuel		V				V
302		Late rejected takeoff decision / initiation					V	
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					

No.	Safety Performance Indicators	Precursors	Operational issue					
			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			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 immediate answer on supporting systems warning. MSAW warning.			V			
323		Late activation of pedal braking or takeover from autobrake, when so required		V				V
324		Delayed selection of reverse thrust		V				V
325		Late thrust reduction or power-on touchdown		V				V
326		Failure to arm ground-spoilers		V				V
327		Inappropriate selection of autobrake mode for given runway length and condition		V				V
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		V				V
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		V				
335		Flaws in aircraft system maintenance process definition - stickshaker			V			

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
336		Lack of adherence to SOP for approach and landing		V				
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				
340		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Electrical / wiring system components		V				
341		Flaws in manufacturer quality control process - Electrical / wiring systems components		V				
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			V			
344		Flaws in manufacturer quality control process - GPWS system components			V			
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			V
135		Lack of adherence to the main CRM rules		V	V			V
136		Incorrect use of automation - FMS		V	V			V
137		Unintuitive and / or error prone system manual - FMS		V	V			V
138		Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing		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		V	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	V			V
141		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path		V				V
142		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology		V	V		V	V
143		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution		V	V		V	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.		V				V
145		Lack of adherence to emergency procedures - control recovery		V				V
146		Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure		V				V

No.	Safety Performance Indicators	Precursors	Operational issue					
			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		V	
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		V	
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			V			
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 immediate 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 clearance 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

No.	Safety Performance Indicators	Precursors	Operational issue						
			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 inappropriate relation between cpt and his subordinates			V				
175		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		V				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						V	
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.						V	
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.						V	
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						V	
195		Navigation deviation						V	
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	

No.	Safety Performance Indicators	Precursors	Operational issue					
			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					V	
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						V
202		Touchdown off centerline						V
203		Inappropriate use of differential reverse thrust						V
204		Inadequate use of differential braking						V
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					V	
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					V	
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					V	
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					V	
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		V			V	V
218		Flaws in manufacturer quality control process - Landing gear components.		V				
219		Flaws in aircraft system maintenance process definition - Landing gear components.		V				
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

No.	Safety Performance Indicators	Precursors	Operational issue					
			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 immediate answer on supporting systems warning. MSAW warning.			V			
234		Lack of adherence to emergency procedures - WEM						V
235		Late thrust reduction or power-on touchdown		V				V
236		Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared						V
237		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System.						V
238		Error in calculation of necessary amount of fuel		V				V
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				V
241		Flaws in manufacturer quality control process - PWS system components						V
242		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.						V
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					V	
247		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.					V	
248		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.					V	
249		Lack of adherence to SOP for approach and landing		V				

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
250		Poor application of T/O & RTO procedure, computation of T/O parameters					V	
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			V			
253		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - GPWS system components			V			
254		Flaws in manufacturer quality control process - GPWS system components			V			
131	Rate of excessive approach speed event/approach	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			V
135		Lack of adherence to the main CRM rules		V	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	V		V
137		Incorrect use of automation - FMS		V	V			V
138		Unintuitive and / or error prone system manual - FMS		V	V			V
139		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology		V	V			V
140		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution		V	V			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.		V	V			V
145		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path		V				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		Altimeter setting error			V	V		
149		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components			V	V		
150		Flaws in manufacturer quality control process - Onboard navigational systems and components.			V	V		

No.	Safety Performance Indicators	Precursors	Operational issue					
			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		V				V
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			V
159		Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure		V				V
160		Aggressive maneuvering / overcontrolling		V				V
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 immediate 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		V				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 clearance instruction			V			
174		Unstabilized final approach (high, fast, steep, ...)		V				V
175		Lack of adherence to SOP for take-off procedure in terms of altimeter calibration.				V		
176		Incorrect or confusing / misleading ATC instructions				V		

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
177		Hearback omitted				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.				V		
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				V		
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 constraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data.				V		
193		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MTCD System				V		
194		Lack of adherence of airlines to declared Flight Plan.				V		
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 separation				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		V				V

No.	Safety Performance Indicators	Precursors	Operational issue						
			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 inappropriate relation between cpt and his subordinates			V				
206		Descent above desired descent profile		V					V
207		Lack of adherence to AFM limitations for landing		V					V
208		Unintuitive and / or error prone system manual - CPCS							V
209		Tailwind component above limit							V
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					V
214		Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared							V
215		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System.							V
216		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system							V
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.							V
219		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - LLWAS system							V
220		Late activation of pedal braking or takeover from autobrake, when so required		V					V
221		Delayed selection of reverse thrust		V					V
222		Inappropriate selection of autobrake mode for given runway length and condition		V					V
223		Lack of adherence to emergency procedures - WEM							V
224		Failure to remember / assess crosswind component limit for prevailing runway condition							V
225		Inadequate crosswind landing / decrab technique							V
226		Touchdown off centerline							V
227		Inappropriate use of differential reverse thrust							V
228		Inadequate use of differential braking							V
229		Use of nose wheel steering tiller during rollout							V

No.	Safety Performance Indicators	Precursors	Operational issue					
			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						V
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				V
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			V			
241		Failure to go-around, when so required			V			
242		Failure to follow published missed-approach procedure			V			
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			V			
245		Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. MSAW warning.			V			
246		Late thrust reduction or power-on touchdown		V				V
247		Error in calculation of necessary amount of fuel		V				V
248		Lack of adherence to SOP in terms of necessary amount of fuel		V				V
249		Lack of adherence to SOP for approach and landing		V				
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			

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
256		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - GPWS system components			V			
257		Flaws in manufacturer quality control process - GPWS system components			V			

No.	Safety Performance Indicators	Precursors	Operational issue					
			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		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		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			V
139		Flaws in CRM training procedures		V	V			V
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			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.		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 in the 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 maintenance - 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			V	
152		Flaws in manufacturer quality control process - Components of Wing control surface system.		V			V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			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.)		V	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		Lack of adherence to SOP in terms of AFM limitations		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		Traffic controller tiredness - Inadequate workload distribution			V			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	V		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	V		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 aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.		V				
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				

No.	Safety Performance Indicators	Precursors	Operational issue					
			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				
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				
183		Flaws in aircraft system maintenance process definition - Compressor in the engine.		V				
184		Flaws in manufacturer quality control process - Engine accessory drive components.		V				
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.		V				
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		V				
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		V				
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		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	
195		Flaws in manufacturer quality control process - Onboard navigational systems and components.			V		V	
196		Lack of or poor communication quality			V		V	
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		V				
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.		V				
201		Flaws in manufacturer quality control process - ECAM (or similar) system components.		V				
202		Flaws in aircraft system maintenance process definition - Engine combustor		V				

No.	Safety Performance Indicators	Precursors	Operational issue						
			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		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		V					
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)			V				
210		Failure to check navigation accuracy before approach			V				
211		Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. Navigational aid failure.			V				
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 clearance instruction			V				
221		Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination			V				
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					V
225		Late deceleration and configuration set-up for approach and landing		V					V
226		DME / ILS DME confusion in assessing the final descent point / FAF		V					V
227		Unstabilized final approach (high, fast, steep, ...)		V					V

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
228		Imbalanced and inappropriate 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				V
231		Lack of adherence to AFM limitations for landing		V				V
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		V			V	
236		Flaws in manufacturer quality control process - Autothrottle system in the engine.		V			V	
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		V				
242		Go-around attempt after thrust reversers deployment		V				V
243		Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared						V
244		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System.						V
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						V
247		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.						V
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						V
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.					V	
253		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance					V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			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					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		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					V	
264		Flaws in manufacturer quality control process - Fire warning system					V	
265		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components					V	
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		V			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.		V				
274		Flaws in aircraft system maintenance process definition - Rudder components.		V				
275		Flaws in manufacturer quality control process - Rudder components.		V				
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				

No.	Safety Performance Indicators	Precursors	Operational issue					
			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 immediate answer on supporting systems warning. MSAW warning.			V			
294		Late activation of pedal braking or takeover from autobrake, when so required		V				V
295		Delayed selection of reverse thrust		V				V
296		Late thrust reduction or power-on touchdown		V				V
297		Failure to arm ground-spoilers		V				V
298		Inappropriate selection of autobrake mode for given runway length and condition		V				V
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				V
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		V				
303		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine fuel distribution system		V				
304		Flaws in manufacturer quality control process - Engine fuel distribution system		V				

No.	Safety Performance Indicators	Precursors	Operational issue					
			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					V	
309		Poor application of T/O & RTO procedure, braking initiation sequence					V	
310		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.					V	
311		Lack of adherence to SOP for approach and landing		V				
312		Flaws in aircraft system maintenance process definition - Electrical wiring System		V				
313		Poor application of T/O & RTO procedure, computation of T/O parameters					V	
314		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS			V			
315		Taxiing without clearance		V				
316		Flaws in aircraft system maintenance process definition - Engine systems and / or components		V				
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		V
132		Flaws in pilot requirements definition process and/or training methodology		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
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		V	V			V
137		Incorrect use of automation - FMS		V	V			V
138		Unintuitive and / or error prone system manual - FMS		V	V			V
139		Flaws in CRM training procedures		V	V			V

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
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		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
144		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path		V					V
145		Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing		V					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		V					V
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 maintenance - 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		V					V
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					

No.	Safety Performance Indicators	Precursors	Operational issue						
			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.		V					
170		Lack of adherence to emergency procedures - control recovery		V					V
171		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		V					
172		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fuel system components		V					
173		Flaws in aircraft system maintenance process definition - Fuel system components		V					
174		Lack of adherence to SARPs in terms of avoiding adverse weather conditions during flight		V					
175		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Reduction gear in the engine		V					
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.		V					
178		Flaws in manufacturer quality control process - Fuel system components.		V					
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		V					
181		Flaws in manufacturer quality control process - Compressor in the engine.		V					
182		Flaws in aircraft system maintenance process definition - Compressor in the engine.		V					
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.		V					
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		V					
187		Flaws in manufacturer quality control process - Engine anti-ice system and / or components		V					
188		Flaws in aircraft system maintenance process definition - Engine anti-ice system and / or components		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		V					

No.	Safety Performance Indicators	Precursors	Operational issue						
			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		V					
193		Inadequate de-icing method applied		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		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.		V					
200		Flaws in aircraft system maintenance process definition - Components of Wing control surface system.		V					
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					
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		V					
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		V					
209		Flaws in manufacturer quality control process - Engine turbine components		V					
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 immediate answer on supporting systems warning. Navigational aid failure.			V				
213		Not recognized ground NavAids System failure not reflected in NOTAM messages			V				
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				

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
		with requirements - Ground navigational systems and components (e.g. ILS)							
216		Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS)			√				
217		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.			√				
218		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).			√				
219		Current airport diagram not reflecting critical changes			√				
220		Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination			√				
221		Lack of adherence to SOP for AIR operations in terms of controller error in approach clearance instruction			√				
222		Lack of adherence to SOP for take-off procedure in terms of altimeter callibration.				√			
223		Incorrect or confusing / misleading ATC instructions				√			
224		Hearback omitted				√			
225		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.				√			
226		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.				√			
227		Flaws in manufacturer quality control process - Communication equipment systems and components.				√			
228		Lack of adherence to Rules of the Air - adherence to Controller clearance				√			
229		Tactical or / and Planning Controller tiredness - Inadequate workload distribution				√			
230		Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology				√			
231		Unintuitive and / or error prone system manual - communication equipment.				√			
232		Altitude deviation				√			
233		Level bust (pilot lapse or late re-clearance by ATC)				√			
234		Failure to comply with an altitude or speed restriction / constraint				√			
235		Navigation deviation				√			
236		Inadequate coordination between ATM centers and/or ATC sectors				√			
237		Flaws in Airspace and Air Traffic planning procedures design process				√			
238		Flaws in conflict and separation minima infringement detection / elimination procedures				√			
239		Lack of adherence of airlines to time constraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data.				√			
240		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance				√			

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
		with requirements - MTCO 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 separation				V			
244		Incorrect use of communication equipment				V			
245		Military activity in controlled airport or located within controlled area				V			
246		General aviation activity in controlled airport or located within controlled area				V			
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 inappropriate 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		V					
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					V
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					V
259		Late deceleration and configuration set-up for approach and landing		V					V
260		DME / ILS DME confusion in assessing the final descent point / FAF		V					V
261		Unstabilized final approach (high, fast, steep, ...)		V					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		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			

No.	Safety Performance Indicators	Precursors	Operational issue					
			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				V
269		Lack of adherence to AFM limitations for landing		V				V
270		Error in calculation of necessary amount of fuel		V				V
271		Unintuitive and / or error prone system manual - CPCS						V
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 immediate answer on supporting systems warning. MSAW warning.			V			
284		Late activation of pedal braking or takeover from autobrake, when so required		V				V
285		Delayed selection of reverse thrust		V				V
286		Late thrust reduction or power-on touchdown		V				V
287		Failure to arm ground-spoilers		V				V
288		Inappropriate selection of autobrake mode for given runway length and condition		V				V
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		V				V
291		Lack of adherence to SOP in terms of necessary amount of fuel		V				V
292		Lack of adherence to AFM in terms of emergency procedures - engine failure		V				
293		Lack of adherence to SOP for approach and landing		V				

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
294		Flaws in aircraft system maintenance process definition - Electrical wiring System		V					
295		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ACAS system components				V			
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			
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				V	V
132		Flaws in pilot requirements definition process and/or training methodology		V				V	V
133		Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing		V					V
134		Lack of adherence to SOP in terms of approach and landing		V					V
135		Flaws in CRM training procedures		V				V	V
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					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		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					V
141		Unintuitive and / or error prone system manual - FMS		V					V
142		Lack of adherence to emergency procedures - control recovery		V					V

No.	Safety Performance Indicators	Precursors	Operational issue						
			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		V				V	V
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		V				V	V
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					V
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		V					V
156		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision						V	
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						V	
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.						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	

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
169		Flaws in manufacturer quality control process - Communication equipment systems and components.					V	
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						V
184		Inadequate use of differential braking						V
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					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	

No.	Safety Performance Indicators	Precursors	Operational issue					
			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					V	
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.					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 presence / or runway surface friction rate below minimum		V			V	V
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		V				V
207		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - 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.					V	
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					V	
219		Incorrect or confusing / misleading ATC instructions					V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			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					V	
224		Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airtaxi and airport topology.					V	
225		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance					V	
226		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airtaxi 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		Undetected incorrect takeoff configuration					V	
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					V	
241		Flaws in Airspace and Air Traffic planning procedures design process					V	
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	

No.	Safety Performance Indicators	Precursors	Operational issue					
			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					V	
250		Flaws in manufacturer quality control process - Engine systems and / or components					V	
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		V			V	V
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				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		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				V
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		V			V	V
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		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

No.	Safety Performance Indicators	Precursors	Operational issue					
			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					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		V				V
156		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					V	
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					V	
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.					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.					V	
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	

No.	Safety Performance Indicators	Precursors	Operational issue					
			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.					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						V
184		Inadequate use of differential braking						V
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					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 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					V	
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

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
		presence / or runway surface friction rate below minimum						
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		V				V
207		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - 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.					V	
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					V	
219		Incorrect or confusing / misleading ATC instructions					V	
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 airtaxi and airport topology.					V	
225		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance					V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			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 airtaxi 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		V				
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					V	
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	

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
252		Flaws in aircraft system maintenance process definition - Engine systems and / or components					V	
131	Rate of delayed application of thrust reversers/landing	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 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				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		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				V
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		V			V	V
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		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		V				V
150		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		V			V	V
151		Descent above desired descent profile		V				V
152		DME / ILS DME confusion in assessing the final descent point / FAF		V				V
153		Unstabilized final approach (high, fast, steep, ...)		V				V
154		Go-around attempt after thrust reversers deployment		V				V

No.	Safety Performance Indicators	Precursors	Operational issue					
			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				V
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	V
163		Inappropriate use of differential reverse thrust						V
164		Inadequate use of differential braking						V
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						V
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		V			V	V
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		V				V
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				V
178		Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.					V	
179		Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.					V	
180		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.					V	
181		Error in calculation of necessary amount of fuel		V				V

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
182		Lack of adherence to SOP in terms of necessary amount of fuel		V					V
183		Incorrect stab-trim setting						V	
184		Late rejected takeoff decision / initiation						V	
185		Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations						V	
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						V	
191		Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications						V	
192		Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airtaxi and airport topology.						V	
193		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance						V	
194		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airtaxi or / and aircraft / vehicle proximity						V	
195		Flaws in traffic controller requirements definition process and/or training methodology						V	
196		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver						V	
197		Takeoff without clearance						V	
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						V	
203		Lack of adherence to AFM limitations for Take-off						V	
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						V	
207		Lack of adherence to SOP for approach and landing		V					

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
208		Undetected incorrect takeoff configuration					V	
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					V	
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.)					V	
229		Lack of adherence to SOP for take-off procedure in terms of speed bug checklist preparation and verification.					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					V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			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					V	
234		Flaws in manufacturer quality control process - Engine systems and / or components					V	
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	
238		Flaws in aircraft system maintenance process definition - Fire detection system components					V	
239		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components					V	
240		Flaws in manufacturer quality control process - Fire detection system components					V	
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					V	
243		Flaws in manufacturer quality control process - Fire warning system					V	
244		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components					V	
245		Flaws in aircraft system maintenance process definition - Fire extinguishing system components					V	
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.					V	
249		Flaws in manufacturer quality control process - Onboard navigational systems and 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	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		V	V	V		V
136		Lack of adherence to SOP in terms of approach and landing		V	V			V
137		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.		V			V	
138		Lack of adherence to the SOP in terms of critical indicators cross-checking		V	V			

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
139		Incorrect use of automation - FMS		V	V				V
140		Unintuitive and / or error prone system manual - FMS		V	V				V
141		Flaws in CRM training procedures		V	V				V
142		Lack of adherence to the main CRM rules		V	V				V
143		Traffic controller tiredness - Inadequate workload distribution		V	V	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				V	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				V	
147		Aggressive maneuvering / overcontrolling		V					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	V	V		
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 components		V					
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	V		
155		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring		V				V	
156		Lack of or poor communication quality			V	V	V		
157		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		V				V	
158		Lack of English proficiency		V	V	V			
159		Use of non-standard phraseology by pilot and/or controller		V	V	V			
160		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components			V	V	V		
161		Flaws in manufacturer quality control process - Onboard navigational systems and components.			V	V	V		
162		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver			V	V			
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					

No.	Safety Performance Indicators	Precursors	Operational issue					
			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.		V				
166		Lack of adherence to SOP in terms of de-icing / anti-icing procedures.		V				
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				V
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	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.		V			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			V	
176		Lack of adherence to emergency procedures - control recovery		V				V
177		Lack of adherence to SOP in terms of AFM limitations		V				
178		Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure		V				V
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			V	
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			

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
		against contamination						
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.		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.			V	V	V	
194		Inadequate de-icing method applied		V				
195		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Compressor in the engine		V				
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.		V				
201		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ECAM (or similar) system components.		V				
202		Lack of adherence to emergency procedures - Fuel starvation		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		Unintuitive and / or error prone system manual - CPCS		V			V	V
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		V				
209		Flaws in manufacturer quality control process - ECAM (or similar) system components.		V				
210		Flaws in manufacturer quality control process - Fire extinguishing system components		V		V	V	
211		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ECAM.		V				
212		Flaws in manufacturer quality control process - APU systems and / or components		V				
213		Flaws in aircraft system maintenance process definition - Engine combustor		V				

No.	Safety Performance Indicators	Precursors	Operational issue					
			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		V				
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 immediate 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 clearance 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		V			V	
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 detection system components		V			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		V			V	
238		Flaws in aircraft system maintenance process definition - Fire warning system		V			V	

No.	Safety Performance Indicators	Precursors	Operational issue						
			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		V				V	
240		Flaws in manufacturer quality control process - Fire warning system		V				V	
241		Hearback omitted					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		V					
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		V					
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		V					
259		Lack of adherence to engine limitations		V					
260		Lack of adherence to SOP for take-off procedure in terms of altimeter calibration.					V		
261		Flaws in conflict and separation minima infringement detection / elimination procedures					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		

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
265		Tactical or / and Planning Controller tiredness - Inadequate workload distribution				V		
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				V		
268		Lack of adherence of airlines to time constraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data.				V		
269		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MTCD System				V		
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				V		
272		Lack of adherence to SOP for Airborne operation in terms of minimum separation				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.		V				
276		Imbalanced and inappropriate 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		V			V	
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, ...)		V				V
279		Late deceleration and configuration set-up for approach and landing		V				V
280		Unstabilized final approach (high, fast, steep, ...)		V				V
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					V	
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		V				
287		Unintuitive and / or error prone system manual - ECAM		V				
288		Descent above desired descent profile		V				V
289		DME / ILS DME confusion in assessing the final descent point / FAF		V				V
290		Flaws in manufacturer quality control process - Engine sensors		V				

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
291		Flaws in aircraft system maintenance process definition - Engine sensors		V				
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			V	
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				V
301		Lack of adherence to SOP in terms of aircraft icing (condition) monitoring		V				
302		Lack of adherence to AFM limitations for landing		V				V
303		Lack of adherence to AFM in terms of emergency procedures - stall recovery		V			V	
304		Excessive pitch attitude		V				
305		Excessive bank angle		V				
306		Inadequate effectiveness 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				

No.	Safety Performance Indicators	Precursors	Operational issue					
			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		V				
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		V				
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		V				
324		Lack of adherence to AFM limitations for Take-off		V				
325		Lack of adherence to SOP in terms of requested information support for other aircraft in terms of adverse weather conditions		V				
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		V				
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		V				
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		V				
335		Lack of adherence to SOP in terms of load sheet preparation and verification		V				
336		Lack of adherence to emergency procedures - recovery from severe FCS failure		V				
337		Unintuitive and / or error prone system manual - On-board weather radar.		V				
338		Incorrect use of automation - On-board weather radar		V				
339		Inadequate airline / regulatory provider policy in terms of aware of the risks related to air travel		V				
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				

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
342		Flaws in aircraft system maintenance process definition - On-board weather radar		V				
343		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components					V	
344		Flaws in manufacturer quality control process - Power supply system components					V	
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		V				
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		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		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		V			V	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.		V				

No.	Safety Performance Indicators	Precursors	Operational issue						
			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.		V					
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 manoeuvre execution - flare		V					
372		Extreme operation condition / poor maintenance quality / advanced life length		V					
373		Long / floating flare							V
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 immediate answer on supporting systems warning. MSAW warning.			V				
388		Late activation of pedal braking or takeover from autobrake, when so required		V					V
389		Delayed selection of reverse thrust		V					V
390		Late thrust reduction or power-on touchdown		V					V
391		Failure to arm ground-spoilers		V					V
392		Inappropriate selection of autobrake mode for given runway length and condition		V					V
393		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment						V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
394		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.					V	
395		Lack of adherence to SOP in terms of necessary amount of fuel		V				V
396		Poor application of T/O & RTO procedure, computation of T/O parameters					V	
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				V		
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	V	V
132		Flaws in pilot requirements definition process and/or training methodology		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
134		Flaws in CRM training procedures		V	V		V	V
135		Lack of adherence to the main CRM rules		V	V		V	V
136		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology		V	V	V	V	V
137		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution		V	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	V			V
140		Unintuitive and / or error prone system manual - FMS		V	V			V
141		Traffic controller tiredness - Inadequate workload distribution		V	V	V	V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
142		Flaws in traffic controller requirements definition process and/or training methodology		V	V	V	V	
143		Lack of or poor communication quality			V	V	V	
144		Lack of English proficiency		V	V	V	V	
145		Use of non-standard phraseology by pilot and/or controller		V	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		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components			V	V	V	
149		Flaws in manufacturer quality control process - Onboard navigational systems and components.			V	V	V	
150		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path		V				V
151		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	
152		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)			V	V	V	
153		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)			V	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	V		
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.			V	V	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				V
165		Current airport diagram not reflecting critical changes			V			
166		Lack of adherence to the SOP in terms of critical indicators cross-checking			V			
167		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude,			V			

No.	Safety Performance Indicators	Precursors	Operational issue						
			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			V				
169		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.				V	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.				V	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 immediate 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 clearance 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)			V				
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		V			V		
183		Flaws in aircraft system maintenance process definition - Hydraulic System		V			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		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire detection system components		V			V		
187		Unintuitive and / or error prone system manual - CPCS		V			V	V	
188		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.		V			V		
189		Inadequate coordination between ATM centers and/or ATC sectors				V			
190		Flaws in aircraft system maintenance process definition - Fire detection system components		V			V		
191		Flaws in manufacturer quality control process - Fire detection system components		V			V		

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
192		Flaws in aircraft system maintenance process definition - Fire warning system		V				V	
193		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system		V				V	
194		Flaws in manufacturer quality control process - Fire warning system		V				V	
195		Hearback omitted					V		
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 constraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data.					V		
201		Incorrect use of communication equipment					V		
202		Separation of structural element / component of the aircraft during take-off or landing		V					
203		Lack of adherence to SOP in terms of fuelling procedure		V					
204		Flaws in aircraft system maintenance process definition - Electrical wiring System		V					
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		V					
208		Inadequate maintenance of fire vulnerable aircraft parts or components		V					
209		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements in terms of fire resistance		V					
210		Lack of adherence to regulations concerning transport of DGR goods		V					
211		Flaws in aircraft system maintenance process definition - Fuel system components		V					
212		Lack of adherence to engine limitations		V					
213		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components		V					
214		Flaws in manufacturer quality control process - Engine systems and / or components		V					
215		Flaws in aircraft system maintenance process definition - Engine systems and / or components		V					
216		Flaws in manufacturer quality control process - APU systems and / or components		V					
217		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance		V					

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
		with requirements - Electrical / wiring system components						
218		Flaws in manufacturer quality control process - Electrical / wiring systems components		V				
219		Lack of adherence to SOP for take-off procedure in terms of altimeter callibration.				V		
220		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MTCD System				V		
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 inapropriate 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		V			V	
230		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		V			V	V
231		Flaws in aircraft system maintenance process definition - Fire extinguishing system components		V			V	
232		Descent above desired descent profile		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		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				V		
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	

No.	Safety Performance Indicators	Precursors	Operational issue						
			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						V	
245		Inadequate effectiveness 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 airtsite and airport topology.						V	
248		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airtsite or / and aircraft / vehicle proximity						V	
249		Takeoff without clearance						V	
250		Landing without clearance						V	
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 / clearance						V	
255		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components						V	
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.						V	
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						V	
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.						V	
266		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Integrity of primary aircraft structure.		V					

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
267		Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.		V				
268		Flaws in manufacturer quality control process - Integrity of primary aircraft structure.		V				
269		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring					V	
270		Late rejected takeoff decision / initiation					V	
271		Flaws in manufacturer quality control process - Landing gear components.		V				
272		Flaws in aircraft system maintenance process definition - Landing gear components.		V				
273		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components		V				
274		Flaws in aircraft system maintenance process definition - Aircraft door system and / or components		V				
275		Flaws in manufacturer quality control process - CPCS system and / or components		V				
276		Flaws in aircraft system maintenance process definition - CPCS system and / or components		V				
277		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - CPCS system and / or components		V				
278		Lack of adherence to SOP for GND movements.		V				
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		V			V	V
280		Poor application of T/O & RTO procedure, failure recognition and preparedness					V	
281		Lack of adherence to emergency procedures - flight deck smoke procedure		V				
282		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 manoeuvre execution - flare		V				
284		Extreme operation condition / poor maintenance quality / advanced life length		V				
285		Incorrect use of automation - CPCS		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			

No.	Safety Performance Indicators	Precursors	Operational issue					
			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 immediate answer on supporting systems warning. MSAW warning.			V			
297		Late activation of pedal braking or takeover from autobrake, when so required		V				V
298		Delayed selection of reverse thrust		V				V
299		Late thrust reduction or power-on touchdown		V				V
300		Failure to arm ground-spoilers		V				V
301		Inappropriate selection of autobrake mode for given runway length and condition		V				V
302		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment					V	
303		Poor application of T/O & RTO procedure, braking initiation sequence					V	
304		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.					V	
305		Error in calculation of necessary amount of fuel		V				V
306		Lack of adherence to SOP in terms of necessary amount of fuel		V				V
307		Poor application of T/O & RTO procedure, computation of T/O parameters					V	
308		Lack of adherence to SOP for approach and landing		V				
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	

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
	RA warnings/warning								
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		V	V	V	V		
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		Lack of adherence to the SOP in terms of critical indicators cross-checking		V	V				
139		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.		V				V	
140		Lack of or poor communication quality			V	V	V		
141		Lack of English proficiency		V	V	V	V		
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	V		
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 components		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	V	V		
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	V	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.		V					
154		Flaws in manufacturer quality control process - Engine systems and / or components		V					
155		Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.		V					
156		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring		V				V	

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
157		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		V				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.		V				V	
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.		V				V	
166		Flaws in manufacturer quality control process - Fuel system components.		V					
167		Aggressive maneuvering / overcontrolling		V					
168		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components		V				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		V					
171		Flaws in manufacturer quality control process - Engine anti-ice system and / or components		V					
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	V	V		
174		Incorrect or confusing / misleading ATC instructions		V			V	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		V					
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.		V					
179		Inadequate de-icing method applied		V					
180		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Compressor in the engine		V					
181		Flaws in manufacturer quality control process - Compressor in the engine.		V					

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
182		Flaws in aircraft system maintenance process definition - Compressor in the engine.		V					
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.		V					
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					
188		Flaws in aircraft system maintenance process definition - Oil distribution system		V					
189		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Oil distribution system		V					
190		Flaws in manufacturer quality control process - Oil distribution system		V					
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.		V					
194		Flaws in manufacturer quality control process - ECAM (or similar) system components.		V					
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		V			V	V	
198		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ECAM.		V					
199		Flaws in Airspace and Air Traffic planning procedures design process					V	V	
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		V					

No.	Safety Performance Indicators	Precursors	Operational issue						
			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 immediate 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)			V				
217		Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS)			V				
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).			V				
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.				V	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 clearance instruction			V				
228		Navigation deviation				V	V		
229		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components		V				V	
230		Flaws in aircraft system maintenance process definition - Hydraulic System		V				V	
231		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire detection system components		V				V	
232		Inadequate coordination between ATM centers and/or ATC sectors				V			

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
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				V	
237		Flaws in manufacturer quality control process - Fire warning system		V				V	
238		Hearback omitted					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 constraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data.					V		
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		V					
257		Lack of adherence to SOP for take-off procedure in terms of altimeter calibration.					V		
258		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MTCD System					V		

No.	Safety Performance Indicators	Precursors	Operational issue					
			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 separation				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 inappropriate 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		V			V	
269		Flaws in aircraft system maintenance process definition - Fire extinguishing system components		V			V	
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		V				
272		Unintuitive and / or error prone system manual - ECAM		V				
273		Flaws in manufacturer quality control process - Engine sensors		V				
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		V				
280		Inadequate effectiveness of fire extinguishing system		V				
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		V				
283		Flaws in aircraft system maintenance process definition - Engine fuel distribution system		V				
284		Unintuitive and / or error prone system manual - fire extinguishing system		V				

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
285		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					V	
286		Lack of adherence to SOP in terms of requested information support for other aircraft in terms of adverse weather conditions		V				
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					V	
289		Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airtaxi 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					V	
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		V				
300		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - On-board weather radar		V				
301		Flaws in manufacturer quality control process - On-board weather radar		V				
302		Flaws in aircraft system maintenance process definition - On-board weather radar		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 / clearance					V	
305		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airtaxi or / and aircraft / vehicle proximity					V	
306		Takeoff without clearance					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		Lack of adherence to the current technology standards in terms of flight safety and efficiency - fuel tank allocation.		V				

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
310		Lack of adherence to SOP in terms of AFM limitations in terms of weigh and balance		V					
311		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine						V	
312		Flaws in manufacturer quality control process - Autothrottle system in the engine.						V	
313		Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.						V	
314		Lack of adherence to SOP for take-off procedure in terms of time limitation for take-off preparation.						V	
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						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					
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						V	
325		Lack of adherence to the SOP in terms of critical manoeuvre 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				

No.	Safety Performance Indicators	Precursors	Operational issue					
			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			
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			V			
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 immediate answer on supporting systems warning. MSAW warning.			V			
342		Flaws in manufacturer quality control process - CPCS system and / or components		V				
343		Flaws in aircraft system maintenance process definition - CPCS system and / or components		V				
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					V	
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		V				
352		Lack of adherence to emergency procedures - control recovery		V				
353		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ACAS system components				V		
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		
356		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ADI system components				V		
357		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ACAS installed on aircraft.				V		
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			V			
361		Flaws in manufacturer quality control process - GPWS system components			V			

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
131	Rate of loss of separation events/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	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		V	V	V	V	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		Traffic controller tiredness - Inadequate workload distribution		V	V	V	V	
139		Flaws in traffic controller requirements definition process and/or training methodology		V	V	V	V	
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		V				V
145		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.		V			V	
146		Lack of or poor communication quality			V	V	V	
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		V				
151		Flaws in aircraft system maintenance process definition - Fuel system components		V				
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			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.		V	V			V
155		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components			V	V	V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			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		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		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	
160		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)			V	V	V	
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				
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			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		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.		V			V	
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			V	
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		V			V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			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		V				
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	V	
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		V				
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 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		V				
193		Flaws in manufacturer quality control process - Compressor in the engine.		V				
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				
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.		V				
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		V				
203		Flaws in manufacturer quality control process - Oil distribution system		V				
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				

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
206		Unintuitive and / or error prone system manual - Engine anti-icing system		V					
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.		V					
209		Flaws in manufacturer quality control process - Fire extinguishing system components		V		V	V		
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		V					
212		Flaws in Airspace and Air Traffic planning procedures design process				V	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		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		V					
218		Flaws in manufacturer quality control process - Engine turbine components		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).			V				
221		Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination			V				
222		Failure to check navigation accuracy before approach			V				
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 immediate answer on supporting systems warning. Navigational aid failure.			V				
226		Lack of adherence to SOP for AIR operations in terms of controller error in approach clearance 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)			V				
231		Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS)			V				

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
232		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.				V	V	
233		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.				V	V	
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		V			V	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			V	
243		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system		V			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 constraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data.				V		
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		V				
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				

No.	Safety Performance Indicators	Precursors	Operational issue						
			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		V					
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.		V					
273		Imbalanced and inappropriate 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		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		V					
278		Unintuitive and / or error prone system manual - ECAM		V					
279		Descent above desired descent profile		V					V
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		V					V
282		DME / ILS DME confusion in assessing the final descent point / FAF		V					V

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
283		Unstabilized final approach (high, fast, steep, ...)		V					V
284		Flaws in manufacturer quality control process - Engine sensors		V					
285		Flaws in aircraft system maintenance process definition - Engine sensors		V					
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 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					V
292		Lack of adherence to AFM limitations for landing		V					V
293		Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications						V	
294		Inadequate effectiveness 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		V					
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 airtaxi and airport topology.						V	
300		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airtaxi 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						V	
304		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision						V	
305		Lack of adherence to SOP in terms of requested information support for other aircraft in terms of adverse weather conditions		V					
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	

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
308		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance					V	
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					V	
311		Incorrect weather report obtained by the flight crew		V				
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					V	
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		V				
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		V				
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					V	
325		Flaws in manufacturer quality control process - Autothrottle system in the engine.					V	
326		Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.					V	
327		Flaws in airport capacity management process					V	
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				V
330		Lack of adherence to SOP in terms of load sheet preparation and verification		V				
331		Late rejected takeoff decision / initiation					V	
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		V				

No.	Safety Performance Indicators	Precursors	Operational issue						
			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		V					
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		V				V	V
340		Poor application of T/O & RTO procedure, failure recognition and preparedness						V	
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 manoeuvre execution - flare		V					
345		Extreme operation condition / poor maintenance quality / advanced life length		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 immediate answer on supporting systems warning. MSAW warning.			V				
359		Late activation of pedal braking or takeover from autobrake, when so required		V					V
360		Delayed selection of reverse thrust		V					V

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
361		Late thrust reduction or power-on touchdown		V				V
362		Failure to arm ground-spoilers		V				V
363		Inappropriate selection of autobrake mode for given runway length and condition		V				V
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					V	
366		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.					V	
367		Lack of adherence to SOP in terms of necessary amount of fuel		V				V
368		Poor application of T/O & RTO procedure, computation of T/O parameters					V	
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				V		
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				V		
375		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ACAS installed on aircraft.				V		
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			V			
379		Flaws in manufacturer quality control process - GPWS system components			V			
131	Rate of STCA warnings/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	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		V	V	V	V	V
136		Traffic controller tiredness - Inadequate workload distribution		V	V	V	V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
137		Flaws in traffic controller requirements definition process and/or training methodology		V	V	V	V	
138		Flaws in CRM training procedures		V	V		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	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		V				V
145		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.		V			V	
146		Lack of or poor communication quality			V	V	V	
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		V				
151		Flaws in aircraft system maintenance process definition - Fuel system components		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	V	V	
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	V	
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 inthe 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

No.	Safety Performance Indicators	Precursors	Operational issue					
			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.		V				
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				
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			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.		V			V	
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				V
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		V			V	
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		V				
185		Flaws in aircraft system maintenance process definition - Engine anti-ice system and / or components		V				
186		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	
187		Incorrect or confusing / misleading ATC instructions		V		V	V	

No.	Safety Performance Indicators	Precursors	Operational issue						
			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		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					
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.		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		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		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					
210		Flaws in Airspace and Air Traffic planning procedures design process					V	V	
211		Flaws in manufacturer quality control process - APU systems and / or components		V					
212		Flaws in aircraft system maintenance process definition - Engine combustor		V					
213		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance		V					

No.	Safety Performance Indicators	Precursors	Operational issue						
			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	V		
220		Lack of adherence to SOP. Lack of awareness and immediate 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 clearance 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				V			
230		Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology				V			
231		Navigation deviation				V	V		
232		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.				V	V		
233		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.				V	V		
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 detection system components		V				V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			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		V			V	
240		Flaws in manufacturer quality control process - Fire detection system components		V			V	
241		Flaws in aircraft system maintenance process definition - Fire warning system		V			V	
242		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system		V			V	
243		Flaws in manufacturer quality control process - Fire warning system		V			V	
244		Unintuitive and / or error prone system manual - CPCS		V			V	V
245		Hearback omitted				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 constraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data.				V		
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		V				
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				
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		V				
262		Lack of adherence to regulations concerning transport of DGR goods		V				
263		Lack of adherence to engine limitations		V				

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
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.		V				
273		Imbalanced and inappropriate 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		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		V				
278		Unintuitive and / or error prone system manual - ECAM		V				
279		Descent above desired descent profile		V				V
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		V				V
282		DME / ILS DME confusion in assessing the final descent point / FAF		V				V
283		Unstabilized final approach (high, fast, steep, ...)		V				V
284		Flaws in manufacturer quality control process - Engine sensors		V				
285		Flaws in aircraft system maintenance process definition - Engine sensors		V				
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		

No.	Safety Performance Indicators	Precursors	Operational issue						
			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		V					V
292		Lack of adherence to AFM limitations for landing		V					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				V	
296		Inadequate effectiveness 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		V					
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 airtaxi and airport topology.						V	
307		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components						V	
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.		V					
313		Incorrect use of automation - On-board weather radar		V					
314		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - On-board weather radar		V					

No.	Safety Performance Indicators	Precursors	Operational issue					
			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					V	
318		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance					V	
319		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airtaxi or / and aircraft / vehicle proximity					V	
320		Takeoff without clearance					V	
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 weight 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				V
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		V				
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		V				
338		Lack of adherence to SOP for GND movements.		V				
339		Flight below maneuvering speeds		V				
340		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice		V			V	V

No.	Safety Performance Indicators	Precursors	Operational issue						
			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.		V					
344		Flaws in manufacturer quality control process - Rudder components.		V					
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.		V					
347		Flaws in manufacturer quality control process - Horizontal stabilizer components.		V					
348		Lack of adherence to AFM in terms of emergency procedures - stall recovery		V					
349		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Thrust reverse system in the engine.		V					
350		Flaws in manufacturer quality control process - Thrust reverse system in the engine.		V					
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 manoeuvre execution - flare		V					
355		Extreme operation condition / poor maintenance quality / advanced life length		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				

No.	Safety Performance Indicators	Precursors	Operational issue						
			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 immediate answer on supporting systems warning. MSAW warning.			V				
369		Late activation of pedal braking or takeover from autobrake, when so required		V					V
370		Delayed selection of reverse thrust		V					V
371		Late thrust reduction or power-on touchdown		V					V
372		Failure to arm ground-spoilers		V					V
373		Inappropriate selection of autobrake mode for given runway length and condition		V					V
374		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment						V	
375		Poor application of T/O & RTO procedure, braking initiation sequence						V	
376		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.						V	
377		Lack of adherence to SOP in terms of necessary amount of fuel		V					V
378		Poor application of T/O & RTO procedure, computation of T/O parameters						V	
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		V					
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					V		
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					V		
387		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ACAS installed on aircraft.					V		
388		Late or inadequate response to ACAS warning					V		
389		Flaws in aircraft system maintenance process definition - GPWS system components			V				
390		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - GPWS system components			V				
391		Flaws in manufacturer quality control process - GPWS system components			V				

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
131	Rate of EGPWS events/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		V	V				V
136		Incorrect use of automation - FMS		V	V				V
137		Unintuitive and / or error prone system manual - FMS		V	V				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	V				
140		Flaws in CRM training procedures		V	V				V
141		Lack of adherence to the main CRM rules		V	V				V
142		Aggressive maneuvering / overcontrolling		V					V
143		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - 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				V
145		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fuel system components		V					
146		Flaws in aircraft system maintenance process definition - Fuel system components		V					
147		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		V				V	V
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.		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		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
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		V					V
153		Traffic controller tiredness - Inadequate workload distribution		V	V				V
154		Flaws in manufacturer quality control process - Engine systems and / or components		V					

No.	Safety Performance Indicators	Precursors	Operational issue						
			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.		V					
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.		V				V	
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.		V				V	
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		V				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		V					
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		V					
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					

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
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		V	
183		Flaws in manufacturer quality control process - Onboard navigational systems and components.			V		V	
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		V				
186		Flaws in manufacturer quality control process - Compressor in the engine.		V				
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				
194		Flaws in aircraft system maintenance process definition - Oil distribution system		V				
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		V	
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.		V				
201		Flaws in manufacturer quality control process - ECAM (or similar) system components.		V				
202		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ECAM.		V				
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				

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
206		Flaws in aircraft system maintenance process definition - Engine combustor		V				
207		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine combustor		V				
208		Flaws in manufacturer quality control process - Engine combustor		V				
209		Flaws in aircraft system maintenance process definition - Engine turbine components		V				
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				
212		Lack of English proficiency		V	V			
213		Use of non-standard phraseology by pilot and/or controller		V	V			
214		Failure to check navigation accuracy before approach			V			
215		Lack of adherence to SOP. Lack of awareness and immediate 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)			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 clearance 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		V			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 detection 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	

No.	Safety Performance Indicators	Precursors	Operational issue						
			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		V				V	
232		Flaws in manufacturer quality control process - Fire warning system		V				V	
233		Flaws in aircraft system maintenance process definition - Electrical wiring System		V					
234		Separation of structural element / component of the aircraft during take-off or landing		V					
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 - Electrical / wiring system components		V					
237		Flaws in manufacturer quality control process - Electrical / wiring systems components		V					
238		Lack of adherence to SOP in terms of fuelling procedure		V					
239		Inadequate maintenance of fire vulnerable aircraft parts or components		V					
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		V					
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, ...)		V					V
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		V					V
246		Unstabilized final approach (high, fast, steep, ...)		V					V
247		Unintuitive and / or error prone system manual - CPCS		V				V	V
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					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		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system		V					V
252		Flaws in manufacturer quality control process - PWS system components		V					V
253		Imbalanced and inappropriate 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.		V					V
255		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - LLWAS system		V					V

No.	Safety Performance Indicators	Precursors	Operational issue						
			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		V				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				V	
259		Descent above desired descent profile		V					V
260		Lack of adherence to AFM limitations for landing		V					V
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		V					
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					V
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					V
270		Inadequate effectiveness 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		V					
274		Unintuitive and / or error prone system manual - fire extinguishing system		V					
275		Excessive pitch attitude		V					
276		Excessive bank angle		V					
277		Lack of adherence to AFM limitations for Take-off		V					
278		Lack of adherence to the SOP in terms of critical manoeuvre 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					

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
		with requirements - ADI system components						
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					V	
287		Flaws in manufacturer quality control process - Power supply system components					V	
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.					V	
296		Tailwind component above limit						V
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				V
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		V			V	V
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					V	
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			

No.	Safety Performance Indicators	Precursors	Operational issue					
			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		V				
315		Lack of adherence to AFM in terms of emergency procedures - windshear recovery		V				
316		Lack of adherence to the SOP in terms of critical manoeuvre execution - flare		V				
317		Extreme operation condition / poor maintenance quality / advanced life length		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				
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 immediate 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		V				
326		Incorrect use of automation - CPCS		V				
327		Late activation of pedal braking or takeover from autobrake, when so required		V				V
328		Delayed selection of reverse thrust		V				V
329		Late thrust reduction or power-on touchdown		V				V
330		Failure to arm ground-spoilers		V				V
331		Inappropriate selection of autobrake mode for given runway length and condition		V				V
332		Use of non-standard phraseology by pilot flying (PF) and/or pilot not flying (PNF)		V				
333		Lack of adherence to SOP in terms of necessary amount of fuel		V				V
334		Lack of adherence to AFM in terms of emergency procedures - engine failure		V				

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
335		Flaws in aircraft system maintenance process definition - stickshaker			V			
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					V	
338		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.					V	
339		Lack of adherence to SOP for approach and landing		V				
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			V			
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			V			
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		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		V	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 maintenance - 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	V			V
139		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fuel system components		V				
140		Flaws in aircraft system maintenance process definition - Fuel system components		V				
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		V	V			V
143		Traffic controller tiredness - Inadequate workload distribution		V	V			V
144		Flaws in manufacturer quality control process - Engine systems and / or components		V				

No.	Safety Performance Indicators	Precursors	Operational issue					
			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		V			V	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.		V				
149		Flaws in manufacturer quality control process - Integrity of primary aircraft structure.		V				
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.		V				
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			V	
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			V	
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		V			V	
160		Flaws in aircraft system maintenance process definition - APU systems and / or components		V			V	
161		Incorrect use of automation - FMS		V	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		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		V	
167		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components			V		V	
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	

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
170		Unintuitive and / or error prone system manual - FMS		V	V				
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.		V					
173		Lack of adherence to emergency procedures - Fuel starvation		V					
174		Lack of or poor communication quality			V		V		
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		V					
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		V					
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.		V					
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		V					
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					

No.	Safety Performance Indicators	Precursors	Operational issue						
			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		V					
201		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine combustor		V					
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		V					
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 immediate 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 clearance 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		V				V	
220		Flaws in aircraft system maintenance process definition - Hydraulic System		V				V	
221		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance		V				V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			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				V
224		Flaws in aircraft system maintenance process definition - Fire warning system		V				V
225		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system		V				V
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		V				
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		V				
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				V
238		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System.		V				V
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.		V				
240		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system		V				V
241		Flaws in manufacturer quality control process - PWS system components		V				V
242		Imbalanced and inappropriate 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.		V				V
244		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - LLWAS system		V				V
245		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components		V				V

No.	Safety Performance Indicators	Precursors	Operational issue						
			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	V
250		Lack of adherence to SOP in terms of awareness on supporting systems warning		V					
251		Unintuitive and / or error prone system manual - ECAM		V					
252		Flaws in manufacturer quality control process - Engine sensors		V					
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		V					
255		Lack of adherence to emergency procedures - WEM		V					V
256		Lack of adherence to AFM in terms of emergency procedures - fire detection and extinguishing procedure		V					
257		Inadequate effectiveness 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		V					
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 manoeuvre execution		V					
265		Difference indications of independent aircraft speed / altitude or attitude indicators		V					
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		V					
269		Flaws in manufacturer quality control process - ADI system components		V					
270		Lack of adherence to AFM in terms of emergency procedures - stall recovery		V					
271		Navigation deviation						V	
272		Lack of adherence to AFM limitations for Take-off		V					

No.	Safety Performance Indicators	Precursors	Operational issue					
			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					V	
274		Flaws in manufacturer quality control process - Power supply system components					V	
275		Lack of adherence to the current technology standards in terms of flight safety and efficiency - fuel tank allocation.		V				
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.					V	
279		Flaws in manufacturer quality control process - Communication equipment systems and components.					V	
280		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine					V	
281		Flaws in manufacturer quality control process - Autothrottle system in the engine.					V	
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, ...)						V
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, ...)						V
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.		V				
294		Error in calculation of necessary amount of fuel		V				
295		Lack of adherence to AFM limitations for landing						V
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			

No.	Safety Performance Indicators	Precursors	Operational issue					
			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.			V			
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 manoeuvre execution - flare		V				
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		V				
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			V			
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		V				
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					V	V
320		Use of non-standard phraseology by pilot flying (PF) and/or pilot not flying (PNF)		V				
321		Descent above desired descent profile						V
322		Lack of adherence to AFM in terms of emergency procedures - engine failure		V				
323		Lack of adherence to emergency procedures - control recovery						V
324		Flaws in aircraft system maintenance process definition - stickshaker			V			

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
325		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment					V	
326		Poor application of T/O & RTO procedure, braking initiation sequence					V	
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					V	
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			V			
332		Flaws in manufacturer quality control process - GPWS system components			V			
131	Rate of navigational errors which result in a loss of separation with terrain/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		V	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			V
139		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.		V			V	
140		Aggressive maneuvering / overcontrolling		V				V
141		Flaws in CRM training procedures		V	V			V
142		Lack of adherence to the main CRM rules		V	V			V
143		Lack of adherence to the SOP in terms of critical indicators cross-checking		V	V			
144		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		V			V	V
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	

No.	Safety Performance Indicators	Precursors	Operational issue					
			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		V				
148		Flaws in aircraft system maintenance process definition - Fuel system components		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.		V	V			V
152		Inadequate aircraft de-icing / anti-icing		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		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		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	
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.)		V	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.		V				
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				V
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		V				V
168		Lack of adherence to SOP in terms of de-icing / anti-icing procedures.		V			V	
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		V			V	

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
171		Flaws in aircraft system maintenance process definition - APU systems and / or components		V				V	
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.		V					
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).		V	V				
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		V					
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		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			V	
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.		V					
187		Traffic controller tiredness - Inadequate workload distribution		V	V				
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		V					
192		Flaws in manufacturer quality control process - Reduction gear in the engine.		V					
193		Flaws in aircraft system maintenance process definition - Reduction gear in the engine.		V					
194		Flaws in manufacturer quality control process - ECAM (or similar) system components.		V					
195		Lack of adherence to emergency procedures - Fuel starvation		V					
196		Unintuitive and / or error prone system manual - CPCS		V				V	V

No.	Safety Performance Indicators	Precursors	Operational issue						
			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		V					
198		Flaws in manufacturer quality control process - Compressor in the engine.		V					
199		Flaws in aircraft system maintenance process definition - Compressor in the engine.		V					
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.		V					
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		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		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		V	V				
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		V					
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		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)			V				
218		Failure to check navigation accuracy before approach			V				
219		Lack of adherence to SOP. Lack of awareness and immediate 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				

No.	Safety Performance Indicators	Precursors	Operational issue					
			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 clearance 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		V			V	
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.					V	
237		Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.					V	
238		Unintuitive and / or error prone system manual - FMC					V	
239		Incorrect stab-trim setting					V	
240		Undetected incorrect takeoff configuration					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				
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		V				

No.	Safety Performance Indicators	Precursors	Operational issue					
			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 inappropriate 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		V			V	
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		V			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					V	
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		V			V	
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		V				V
269		Flaws in manufacturer quality control process - Engine sensors		V				
270		Flaws in aircraft system maintenance process definition - Engine sensors		V				
271		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine sensors		V				

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
272		Lack of adherence to AFM in terms of emergency procedures - fire detection and extinguishing procedure		V				
273		Go-around attempt after thrust reversers deployment		V				V
274		Lack of adherence to AFM limitations for landing		V				V
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 effectiveness 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		V				
282		Excessive pitch attitude		V				
283		Excessive bank angle		V				
284		Lack of adherence to the SOP in terms of critical manoeuvre execution		V				
285		Difference indications of independent aircraft speed / altitude or attitude indicators		V				
286		Lack of adherence to SOP in terms of safety best practices		V				
287		Flaws in aircraft system maintenance process definition - ADI system components		V				
288		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ADI system components		V				
289		Flaws in manufacturer quality control process - ADI system components		V				
290		Flaws in aircraft system maintenance process definition - stickshaker		V	V			V
291		Flight below maneuvering speeds		V				
292		Navigation deviation						V
293		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - stickshaker system components		V				V
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.						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.						V

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
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				
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.		V				
302		Flaws in aircraft system maintenance process definition - Horizontal stabilizer components.		V				
303		Flaws in manufacturer quality control process - Horizontal stabilizer components.		V				
304		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Thrust reverse system in the engine.		V				
305		Flaws in manufacturer quality control process - Thrust reverse system in the engine.		V				
306		Flaws in aircraft system maintenance process definition - Thrust reverse system in the engine.		V				
307		Poor application of T/O & RTO procedure, aircraft handling					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		V			V	V
309		Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing					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	
312		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - antiice fluid HOT					V	
313		Applied de-icing / anti-icing method is not sufficient for predicted conditions					V	
314		Lack of adherence to SOP in terms of aircraft icing (condition) monitoring					V	
315		Error in calculation of necessary amount of fuel		V				V
316		Tailwind component above limit						V
317		Long / floating flare						V
318		Incorrect or confusing / misleading ATC instructions		V	V			
319		Poor application of T/O & RTO procedure, braking initiation sequence					V	
320		Lack of adherence to SOP for GND movements.		V				
321		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment					V	
322		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.					V	
323		Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain)			V			

No.	Safety Performance Indicators	Precursors	Operational issue					
			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			V			
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 manoeuvre execution - flare		V				
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			V			
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		V				
341		Flaws in aircraft system maintenance process definition - CPCS system and / or components		V				
342		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - CPCS system and / or components		V				
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		V				V
346		Late thrust reduction or power-on touchdown		V				V
347		Failure to arm ground-spoilers		V				V
348		Inappropriate selection of autobrake mode for given runway length and condition		V				V
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)		V				

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
351		Lack of adherence to SOP in terms of necessary amount of fuel		V					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		V					
354		Lack of adherence to AFM in terms of emergency procedures - engine failure		V					
355		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine fuel distribution system		V					
356		Flaws in manufacturer quality control process - Engine fuel distribution system		V					
357		Flaws in aircraft system maintenance process definition - Engine fuel distribution system		V					
358		Inadequate stall recovery procedure for the aircraft						V	
359		Unintuitive and / or error prone system manual - ground radar.						V	
360		Flaws in manufacturer quality control process - TOCW system components						V	
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						V	
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		V	V	V	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	
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			V
136		Incorrect use of automation - FMS		V	V				V
137		Unintuitive and / or error prone system manual - FMS		V	V				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	V				

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
140		Flaws in CRM training procedures		V	V			V
141		Lack of adherence to the main CRM rules		V	V			V
142		Aggressive maneuvering / overcontrolling		V				V
143		Flaws in traffic controller requirements definition process and/or training methodology		V	V	V		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 maintenance - 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			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 components		V				
149		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		V			V	V
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	V	
154		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components			V	V	V	
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		V				V
158		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)			V	V	V	
159		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)			V	V	V	
160		Flaws in manufacturer quality control process - Engine systems and / or components		V				
161		Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing		V				V
162		Lack of English proficiency		V	V	V		
163		Use of non-standard phraseology by pilot and/or controller		V	V	V		

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
164		Inadequate aircraft de-icing / anti-icing		V				V	
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.		V					
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.		V				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				V	
176		Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure		V					V
177		Flaws in manufacturer quality control process - Fuel system components.		V					
178		Lack of adherence to emergency procedures - control recovery		V					V
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		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		V					
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		V					
188		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.			V			V	
189		Inadequate de-icing method applied		V					

No.	Safety Performance Indicators	Precursors	Operational issue						
			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.		V					
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		V					
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.		V					
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		V					
209		Flaws in manufacturer quality control process - Oil distribution system		V					
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		V					
213		Flaws in manufacturer quality control process - Engine combustor		V					
214		Flaws in aircraft system maintenance process definition - Engine turbine components		V					

No.	Safety Performance Indicators	Precursors	Operational issue						
			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)			V				
218		Failure to check navigation accuracy before approach			V				
219		Lack of adherence to SOP. Lack of awareness and immediate 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		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 clearance 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				V	
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.				V	V		
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 detection system components		V				V	
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				V	
237		Flaws in manufacturer quality control process - Fire warning system		V				V	
238		Incorrect or confusing / misleading ATC instructions		V	V	V			
239		Flaws in aircraft system maintenance process definition - Electrical wiring System		V					

No.	Safety Performance Indicators	Precursors	Operational issue						
			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		V					
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		V					
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 constraints 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 - MTCO 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 separation					V		

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
266		Incorrect use of communication equipment				V		
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, ...)		V				V
272		Late deceleration and configuration set-up for approach and landing		V				V
273		DME / ILS DME confusion in assessing the final descent point / FAF		V				V
274		Unstabilized final approach (high, fast, steep, ...)		V				V
275		Unintuitive and / or error prone system manual - CPCS		V			V	V
276		Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared		V				V
277		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System.		V				V
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.		V				
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 inappropriate 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				V
283		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - LLWAS system		V				V
284		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components		V			V	
285		Flaws in aircraft system maintenance process definition - Fire extinguishing system components		V			V	
286		Descent above desired descent profile		V				V
287		Lack of adherence to AFM limitations for landing		V				V
288		Lack of adherence to AFM in terms of emergency procedures - engine restart procedure		V				
289		Lack of adherence to SOP in terms of awareness on supporting systems warning		V				
290		Unintuitive and / or error prone system manual - ECAM		V				
291		Flaws in manufacturer quality control process - Engine sensors		V				

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
292		Flaws in aircraft system maintenance process definition - Engine sensors		V				
293		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine sensors		V				
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.				V		
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				V		
298		Lack of adherence to AFM in terms of emergency procedures - fire detection and extinguishing procedure		V				
299		Go-around attempt after thrust reversers deployment		V				V
300		Inadequate effectiveness 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		V				
302		Flaws in manufacturer quality control process - Engine fuel distribution system		V				
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 manoeuvre 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		V				
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		V				
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				

No.	Safety Performance Indicators	Precursors	Operational issue					
			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					V	
319		Flaws in manufacturer quality control process - Power supply system components					V	
320		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine					V	
321		Flaws in manufacturer quality control process - Autothrottle system in the engine.					V	
322		Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.					V	
323		Tailwind component above limit						V
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				V
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		V			V	V
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					V	
329		Lack of adherence to SOP for GND movements.		V				
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		V				
341		Lack of adherence to the SOP in terms of critical manoeuvre execution - flare		V				
342		Extreme operation condition / poor maintenance quality / advanced life length		V				
343		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components		V				

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
344		Flaws in aircraft system maintenance process definition - Aircraft door system and / or components		V					
345		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MSAW System			V				
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 immediate 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					V
353		Delayed selection of reverse thrust		V					V
354		Late thrust reduction or power-on touchdown		V					V
355		Failure to arm ground-spoilers		V					V
356		Inappropriate selection of autobrake mode for given runway length and condition		V					V
357		Use of non-standard phraseology by pilot flying (PF) and/or pilot not flying (PNF)		V					
358		Lack of adherence to SOP in terms of necessary amount of fuel		V					V
359		Lack of adherence to AFM in terms of emergency procedures - engine failure		V					
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.						V	
364		Lack of adherence to SOP for approach and landing		V					
365		Poor application of T/O & RTO procedure, computation of T/O parameters						V	
366		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ACAS system components				V			
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					V		
369		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ACAS installed on aircraft.					V		

No.	Safety Performance Indicators	Precursors	Operational issue					
			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			V			
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				V
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		V				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				V
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.		V				V
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		V				V
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				V
149		Late deceleration and configuration set-up for approach and landing		V				V
150		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components						V

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
151		Descent above desired descent profile							V
152		DME / ILS DME confusion in assessing the final descent point / FAF							V
153		Unstabilized final approach (high, fast, steep, ...)							V
154		Go-around attempt after thrust reversers deployment		V					V
155		Lack of adherence to AFM limitations for landing		V					V
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					V
161		Delayed selection of reverse thrust		V					V
162		Inappropriate selection of autobrake mode for given runway length and condition		V					V
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							

No.	Safety Performance Indicators	Precursors	Operational issue					
			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						V
186		Inadequate use of differential braking						V
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						V
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						V
197		Touchdown off centerline						V
198		Use of nose wheel steering tiller during rollout						V
199		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure						V
200		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.						V
201		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring		V				V
202		Failure to arm ground-spoilers						V
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

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
204		Lack of adherence to AFM in terms of emergency procedures - stall recovery		V				
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		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		V			V	V
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		V			V	V
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 maintenance - 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		V			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		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.		V			V	
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	

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
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				
154		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fuel system components		V				
155		Flaws in aircraft system maintenance process definition - Fuel system components		V				
156		Flaws in manufacturer quality control process - Fuel system components.		V				
157		Flaws in manufacturer quality control process - Landing gear components.		V				
158		Flaws in aircraft system maintenance process definition - Landing gear components.		V				
159		Unintuitive and / or error prone system manual - CPCS		V			V	V
160		Unintuitive and / or error prone system manual - FMS		V				V
161		Incorrect use of automation - FMS		V				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		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		V				
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		V				
171		Flaws in manufacturer quality control process - Compressor in the engine.		V				
172		Flaws in aircraft system maintenance process definition - Compressor in the engine.		V				
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				

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
177		Lack of adherence to emergency procedures - Fuel starvation		V				
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 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				V
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		V				
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		V				
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				V
193		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path		V				V
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.		V				V
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				V
197		Lack of adherence to the main CRM rules		V				V
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.		V				V
199		Lack of adherence to emergency procedures - control recovery		V				V
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

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
202		Unintuitive and / or error prone system manual - FMC					V	
203		Incorrect stab-trim setting					V	
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		V				
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	
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, ...)		V				V
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.)		V			V	
223		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)		V			V	
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.		V			V	
226		Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.		V			V	

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
227		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)		V				V	
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						V	
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		V					
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.		V				V	
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				V	
243		Flaws in aircraft system maintenance process definition - Electrical wiring System		V				V	
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		V					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		V					
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						V	
253		Lack of adherence to SARPs included in Annex 14 and related documents in terms of RWY parameters and location, attitude,		V					

No.	Safety Performance Indicators	Precursors	Operational issue					
			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 manoeuvre execution		V				
255		Applied de-icing / anti-icing method is not sufficient for predicted conditions		V			V	
256		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System					V	
257		Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination		V				
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		V				
265		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ADI		V				
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		V				
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		V				
277		Lack of adherence to SOP in terms of AFM limitations in terms of weigh and balance		V				

No.	Safety Performance Indicators	Precursors	Operational issue						
			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				V	
282		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - stickshaker system components		V				V	
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		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						V	
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						V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			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					V	
304		Flaws in aircraft system maintenance process definition - Fire extinguishing system components					V	
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.					V	
310		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.					V	
311		Flaws in manufacturer quality control process - Communication equipment systems and components.					V	
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.		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		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.					V	
327		Flaws in manufacturer quality control process - Onboard navigational systems and components.					V	

No.	Safety Performance Indicators	Precursors	Operational issue						
			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		V				V	V
329		Lack of adherence to SOP in terms of pre-flight inspections - ice presence on aircraft		V					
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		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						V	
338		Lack of adherence to TO procedure in terms of anti-ice 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		V					
346		Lack of adherence to SOP for GND movements.		V					
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 manoeuvre execution - flare		V					
351		Extreme operation condition / poor maintenance quality / advanced life length		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					

No.	Safety Performance Indicators	Precursors	Operational issue					
			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			V	
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					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		V				
365		Inadequate stall recovery procedure for the aircraft					V	
366		Unintuitive and / or error prone system manual - ground radar.					V	
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		V				
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		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		V			V	V
136		Aggressive maneuvering / overcontrolling		V				V
137		Inadequate aircraft de-icing / anti-icing		V			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		V				V
140		Incorrect use of automation - FMS		V				V

No.	Safety Performance Indicators	Precursors	Operational issue						
			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				V	V
142		Flaws in CRM training procedures		V				V	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.		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.		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		V					V
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.		V				V	
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.		V					
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 maintenance - 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		V					
165		Flaws in aircraft system maintenance process definition - Fuel system components		V					

No.	Safety Performance Indicators	Precursors	Operational issue						
			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					
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		V					
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.		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		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		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.		V					
186		Flaws in manufacturer quality control process - ECAM (or similar) system components.		V					
187		Lack of adherence to emergency procedures - Fuel starvation		V					
188		Inadequate de-icing method applied		V					
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					

No.	Safety Performance Indicators	Precursors	Operational issue					
			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		V				
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		V				
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		V				
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		V			V	
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		V				
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, ...)		V				V
209		Late deceleration and configuration set-up for approach and landing		V				V
210		Unstabilized final approach (high, fast, steep, ...)		V				V
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					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			V	
215		Lack of adherence to AFM in terms of emergency procedures - engine restart procedure		V				

No.	Safety Performance Indicators	Precursors	Operational issue					
			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.)		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			V	
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			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				V
225		DME / ILS DME confusion in assessing the final descent point / FAF		V				V
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		V				
229		Lack of adherence to SOP in terms of safety best practices		V				
230		Go-around attempt after thrust reversers deployment		V				V
231		Lack of adherence to SOP in terms of aircraft icing (condition) monitoring		V				
232		Lack of adherence to AFM limitations for landing		V				V
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 manoeuvre 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				

No.	Safety Performance Indicators	Precursors	Operational issue						
			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		V					
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		V					
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		V					
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		V					
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		V					
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					

No.	Safety Performance Indicators	Precursors	Operational issue					
			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					V	
269		Flaws in aircraft system maintenance process definition - Hydraulic System					V	
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					V	
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					V	
277		Flaws in manufacturer quality control process - Fire warning system					V	
278		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components					V	
279		Flaws in aircraft system maintenance process definition - Fire extinguishing system components					V	
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					V	
282		Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airtsite and airport topology.					V	
283		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance					V	
284		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airtsite or / and aircraft / vehicle proximity					V	
285		Takeoff without clearance					V	
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					V	
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				
291		Lack of adherence to SOP in terms of providing flight crew with current weather report		V				

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
292		Flaws in manufacturer quality control process - Power supply system components					V	
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.					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				
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.		V				
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.		V				
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		V				
315		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - On-board weather radar		V				
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				

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
318		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components					V	
319		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.					V	
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						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	V
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					V	
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				V
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		V				V
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					V	
342		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.					V	
343		Use of non-standard phraseology by pilot flying (PF) and/or pilot not flying (PNF)		V				

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
344		Lack of adherence to SOP in terms of necessary amount of fuel		V					V
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		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		V					
350		Flaws in manufacturer quality control process - Electrical / wiring systems components		V					
131	Rate of runway incursion events/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		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	V	V				V	
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				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 - 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				V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			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 airtaxi 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 maintenance - 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		V			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			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 / clearance	V				V	
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 components		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				

No.	Safety Performance Indicators	Precursors	Operational issue					
			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			V	
180		Current airport diagram not reflecting critical changes	V					
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 omitted	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				V	
194		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		V			V	
195		Inadequate effectiveness 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					V	
199		Lack of adherence to the main CRM rules					V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
200		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.					V	
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	
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					V	
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.)					V	
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					V	
214		Navigation deviation					V	
215		Flaws in Airspace and Air Traffic planning procedures design process					V	
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.					V	
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					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					

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
225		Late rejected takeoff decision / initiation					V	
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.		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 manoeuvre 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		V				
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					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	

No.	Safety Performance Indicators	Precursors	Operational issue					
			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	V	V			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			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 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			V	
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 airtaxi 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 / clearance	V				V	
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 airtaxi or / and aircraft / vehicle proximity	V				V	
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				V	
150		Landing without clearance	V				V	
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 maintenance - presence of contaminations.		V			V	
153		Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	V				V	
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				

No.	Safety Performance Indicators	Precursors	Operational issue						
			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		V					
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		V					
161		Inadequate maintenance of fire vulnerable aircraft parts or components		V					
162		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements in terms of fire resistance		V					
163		Lack of adherence to regulations concerning transport of DGR goods		V					
164		Flaws in aircraft system maintenance process definition - Fuel system components		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		V					
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		V					
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		V					
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		V					
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.		V					
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		V					
179		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system		V					

No.	Safety Performance Indicators	Precursors	Operational issue					
			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 omitted	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					V	
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				
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			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		Unintuitive and / or error prone system manual - CPCS		V			V	
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 effectiveness of fire extinguishing system		V				
200		Unintuitive and / or error prone system manual - fire extinguishing system		V				
201		Flaws in CRM training procedures					V	
202		Lack of adherence to the main CRM rules					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		Flaws in Airspace and Air Traffic planning procedures design process					V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
206		Flaws in airport capacity management process					V	
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					V	
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.		V				
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 manoeuvre 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		V				
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	V					
228		Inadequate management / separation of takeoffs and landings	V					
229		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment					V	
230		Poor application of T/O & RTO procedure, braking initiation sequence					V	
231		Inadequate maintenance of RWY. Lack of adherence to ICAO Annex 14 in terms of RWY surface condition. Snow / ice					V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			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	

No.	Safety Performance Indicators	Precursors	Operational issue					
			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	V			V	
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	V	V			V	
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			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 - 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 airtsite 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 airtsite 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 maintenrance - presence of contaminations.		V			V	
152		Flaws in aircraft system maintenance process definition - Fire detection system components		V			V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			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			V	
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 / clearance	V				V	
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 components		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		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 /		V				

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
		warning or / and extinguishing system.						
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					
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 omitted	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					V
194		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		V				V
195		Inadequate effectiveness 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						V
199		Lack of adherence to the main CRM rules						V
200		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.						V
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

No.	Safety Performance Indicators	Precursors	Operational issue					
			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.					V	
205		Inadequate aircraft de-icing / anti-icing					V	
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.)					V	
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					V	
214		Navigation deviation					V	
215		Flaws in Airspace and Air Traffic planning procedures design process					V	
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.					V	
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					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					
225		Late rejected takeoff decision / initiation					V	
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					

No.	Safety Performance Indicators	Precursors	Operational issue						
			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.	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.		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 manoeuvre execution - flare		V					
238		Extreme operation condition / poor maintenance quality / advanced life length		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		V					
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						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		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	V					
133		Traffic controller tiredness - Inadequate workload distribution	V	V					

No.	Safety Performance Indicators	Precursors	Operational issue					
			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	V				
140		Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airtaxi and airport topology.	V					
141		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	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 airtaxi 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 omitted	V					

No.	Safety Performance Indicators	Precursors	Operational issue					
			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					
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.	V					
166		Lack of adherence to ICAO Annex 14 and related documents in terms of airside lights distribution	V					
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 manoeuvre 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				

No.	Safety Performance Indicators	Precursors	Operational issue					
			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	V		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		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	V		V	V	V
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			V	V
140		Lack of adherence to the main CRM rules		V			V	V
141		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		V			V	V
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				V
144		Incorrect use of automation - FMS		V				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				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				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 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
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

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
155		Lack of English proficiency	V	V		V	V	
156		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring		V			V	
157		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		V			V	
158		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	V			V	V	
159		Inadequate aircraft de-icing / anti-icing		V			V	
160		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.		V			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.		V			V	
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		Lack of adherence to the SOP in terms of critical indicators cross-checking		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 - Fuel system components		V				
168		Flaws in aircraft system maintenance process definition - Fuel system components		V				
169		Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure		V				V
170		Flaws in manufacturer quality control process - Fuel system components.		V				
171		Lack of adherence to emergency procedures - control recovery		V				V
172		Flaws in manufacturer quality control process - Landing gear components.		V				
173		Flaws in aircraft system maintenance process definition - Landing gear components.		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		V				
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		V				
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				

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
181		Inadequate de-icing method applied		V				
182		Hearback omitted	V			V		
183		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Compressor in the engine		V				
184		Flaws in manufacturer quality control process - Compressor in the engine.		V				
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.		V				
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				
191		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components		V				
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		V				
194		Flaws in manufacturer quality control process - Oil distribution system		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		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		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				

No.	Safety Performance Indicators	Precursors	Operational issue						
			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					
208		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		
209		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)		V		V	V		
210		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)		V		V	V		
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.				V	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	V		
214		Flaws in manufacturer quality control process - Communication equipment systems and components.				V	V		
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				V			
217		Navigation deviation				V	V		
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.				V	V		
220		Flaws in manufacturer quality control process - Fire extinguishing system components				V	V		
221		Unintuitive and / or error prone system manual - CPCS		V			V	V	
222		Inadequate coordination between ATM centers and/or ATC sectors				V			
223		Landing without clearance	V				V		
224		Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	V				V		
225		Unintuitive and / or error prone system manual - communication equipment.				V			
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 constraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data.				V			
230		Incorrect use of communication equipment				V			
231		Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	V				V		

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
232		Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airtsite 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				V		
236		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	V				V	
237		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airtsite 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 calibration.				V		
240		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MTCD System				V		
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 separation				V		
244		Military activity in controlled airport or located within controlled area				V		
245		General aviation activity in controlled airport or located within controlled area				V		
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			V	
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					

No.	Safety Performance Indicators	Precursors	Operational issue					
			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.				V		
271		Lack of adherence to regulations concerning independent ATCO monitoring				V		
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			V	
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		V				
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				

No.	Safety Performance Indicators	Precursors	Operational issue						
			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.				V	V		
286		Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications					V		
287		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components					V		
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		V					
290		Flaws in manufacturer quality control process - Power supply system components					V		
291		Flaws in airport capacity management process					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		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		V					
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					V		
302		Flaws in aircraft system maintenance process definition - Hydraulic System					V		
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		V					
305		Lack of adherence to SOP in terms of pre-flight inspections - cargo securing quality		V					
306		Flaws in aircraft system maintenance process definition - Fire detection system components					V		
307		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components					V		

No.	Safety Performance Indicators	Precursors	Operational issue					
			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	
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	
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				V
316		Lack of adherence to SOP in terms of load sheet preparation and verification		V				
317		Late rejected takeoff decision / initiation					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				
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			V	V
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					V	
331		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Rudder components.		V				

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
332		Flaws in aircraft system maintenance process definition - Rudder components.		V				
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.		V				
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.		V				
340		Flaws in aircraft system maintenance process definition - Thrust reverse system in the engine.		V				
341		Lack of adherence to emergency procedures - flight deck smoke procedure		V				
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 manoeuvre execution - flare		V				
344		Extreme operation condition / poor maintenance quality / advanced life length		V				
345		Incorrect use of automation - CPCS		V				
346		Lack of adherence to the current technology standards in terms of flight safety and efficiency - engines location.		V				
347		Late activation of pedal braking or takeover from autobrake, when so required		V				V
348		Delayed selection of reverse thrust		V				V
349		Late thrust reduction or power-on touchdown		V				V
350		Failure to arm ground-spoilers		V				V
351		Inappropriate selection of autobrake mode for given runway length and condition		V				V
352		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment					V	
353		Poor application of T/O & RTO procedure, braking initiation sequence					V	
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		V				V
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		V				
358		Lack of adherence to AFM in terms of emergency procedures - engine failure		V				

No.	Safety Performance Indicators	Precursors	Operational issue					
			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				V		
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	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		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	V	V	V		V	V
135		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	V	V	V		V	V
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		Lack of adherence to SOP in terms of approach and landing		V	V			V
139		Flaws in CRM training procedures		V	V		V	V
140		Lack of adherence to the main CRM rules		V	V		V	V
141		Lack of adherence to the SOP in terms of critical indicators cross-checking		V	V			
142		Incorrect use of automation - FMS		V	V			V
143		Unintuitive and / or error prone system manual - FMS		V	V			V
144		Aggressive maneuvering / overcontrolling		V				V
145		Lack of English proficiency	V	V	V	V	V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
146		Use of non-standard phraseology by pilot and/or controller	V	V	V	V	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	V			V
151		Lack of adherence to SOP in terms of de-icing / anti-icing procedures.		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 SARPs included in Annex 14 and related documents in terms of RWY parameters and location, approach path parameters and obstacles locations.		V	V			V
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 in the 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		V				V
157		Incorrect or confusing / misleading ATC instructions	V	V		V	V	
158		Current airport diagram not reflecting critical changes	V		V			
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.		V				
161		Flaws in manufacturer quality control process - Integrity of primary aircraft structure.		V				
162		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring		V			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		V				
166		Altimeter setting error			V	V		
167		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		
168		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)			V	V		
169		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)			V	V		
170		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components			V	V		

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
171		Flaws in manufacturer quality control process - Onboard navigational systems and components.			V	V		
172		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.		V			V	
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 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		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		Incorrect use of automation -Engine anti-ice system		V				
183		Flaws in manufacturer quality control process - Fuel system components.		V				
184		Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airtaxi and airport topology.	V				V	
185		Inadequate de-icing method applied		V				
186		Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination		V	V			
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				
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				
192		Lack of adherence to emergency procedures - Fuel starvation		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				

No.	Safety Performance Indicators	Precursors	Operational issue					
			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.		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		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.		V				
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		V				
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 / clearance	V				V	
211		Hearback omitted	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		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		V				
218		Flaws in manufacturer quality control process - Engine turbine components		V				
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, ...)		V				V

No.	Safety Performance Indicators	Precursors	Operational issue						
			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					V
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 immediate answer on supporting systems warning. Navigational aid failure.			V				
225		Lack of adherence to SOP for AIR operations in terms of controller error in approach clearance instruction			V				
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	V		
233		Unstabilized final approach (high, fast, steep, ...)		V					V
234		Unintuitive and / or error prone system manual - CPCS		V			V	V	
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		V			V	V	
236		Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	V				V		
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					V	V	
239		Takeoff without clearance	V				V		
240		Landing without clearance	V				V		
241		Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	V				V		
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 calibration.				V			

No.	Safety Performance Indicators	Precursors	Operational issue					
			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 constraints 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		
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 separation				V		
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		V				V
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					V
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		V				V

No.	Safety Performance Indicators	Precursors	Operational issue						
			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.		V					V
274		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system		V					V
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 inappropriate relation between cpt and his subordinates			V				
278		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.		V					V
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					
281		Lack of adherence to SOP in terms of aircraft icing (condition) monitoring		V				V	
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						V	
287		Late rejected takeoff decision / initiation						V	
288		Descent above desired descent profile		V					V
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					V
293		Lack of adherence to AFM in terms of emergency procedures - engine restart procedure		V					
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		V					
297		Lack of adherence to SOP in terms of awareness on supporting systems warning		V					
298		Unintuitive and / or error prone system manual - ECAM		V					

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
299		Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations					V	
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				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		
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				V		
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		V				
324		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance	V					

No.	Safety Performance Indicators	Precursors	Operational issue					
			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 manoeuvre 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				V
344		Delayed selection of reverse thrust		V				V
345		Inappropriate selection of autobrake mode for given runway length and condition		V				V
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		V				
349		Lack of adherence to SOP in terms of "fasten your seat belt" information activation in passenger cabin during flight in		V				

No.	Safety Performance Indicators	Precursors	Operational issue						
			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							V
365		Touchdown off centerline							V
366		Use of nose wheel steering tiller during rollout							V
367		Flaws in aircraft system maintenance process definition - stickshaker		V				V	
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				V	
370		Incorrect use of automation - TOCW System						V	
371		Lack of adherence to SOP in terms of awareness on supporting systems warning - stickshaker		V				V	
372		Flaws in aircraft system maintenance process definition - TOCW System						V	
373		Unintuitive and / or error prone system manual - TOCW						V	
374		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System						V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			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	
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				
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				
382		Flaws in aircraft system maintenance process definition - FCS systems or components		V				
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					
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 anti-ice protection		V				
391		Flaws in manufacturer quality control process - anti-ice fluid specifications (HOT)		V				
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			
395		Premature descent to DA(H) before G/S intercept or premature descent to MDA(H) before final-descent-point / FAF			V			
396		Premature descent below MDA(H) before reaching the visual-descent-point (VDP)			V			
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			

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
401		Failure to follow published missed-approach procedure			V			
402		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of MSAW system.			V			
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		V				
405		Lack of adherence to the SOP in terms of critical manoeuvre execution - flare		V				
406		Extreme operation condition / poor maintenance quality / advanced life length		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			V			
410		Lack of adherence to the current technology standards in terms of flight safety and efficiency - engines location.		V				
411		Lack of adherence to SOP. Lack of awareness and immediate 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		V				
414		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - CPCS system and / or components		V				
415		Incorrect use of automation - CPCS		V				
416		Late thrust reduction or power-on touchdown		V				V
417		Failure to arm ground-spoilers		V				V
418		Poor application of T/O & RTO procedure, braking initiation sequence					V	
419		Use of non-standard phraseology by pilot flying (PF) and/or pilot not flying (PNF)		V				
420		Lack of adherence to SOP in terms of necessary amount of fuel		V				V
421		Poor application of T/O & RTO procedure, computation of T/O parameters					V	
422		Lack of adherence to AFM in terms of emergency procedures - engine failure		V				
423		Inadequate stall recovery procedure for the aircraft					V	
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		

No.	Safety Performance Indicators	Precursors	Operational issue						
			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		V			V	V	
132		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution		V			V	V	
133		Pilot tiredness - Inadequate workload distribution		V			V	V	
134		Flaws in pilot requirements definition process and/or training methodology		V			V	V	
135		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring		V			V	V	
136		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		V			V	V	
137		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties		V			V		
138		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - 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			V	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					

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
145		Aggressive maneuvering / overcontrolling		V				
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 components		V				
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		V				
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		V				
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		V				
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.		V				
166		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ECAM (or similar) system components.		V				
167		Flaws in aircraft system maintenance process definition - ECAM (or similar) system components.		V				
168		Unintuitive and / or error prone system manual - Engine anti-icing system		V				
169		Lack of adherence to SOP in terms of de-icing / anti-icing procedures.		V				

No.	Safety Performance Indicators	Precursors	Operational issue					
			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		V				
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		V				
187		Flaws in manufacturer quality control process - Engine turbine components		V				
188		Unintuitive and / or error prone system manual - CPCS		V			V	V
189		Lack of adherence to AFM in terms of emergency procedures - engine restart procedure		V				
190		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components		V				
191		Flaws in manufacturer quality control process - APU systems and / or components		V				
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		V				
194		Unintuitive and / or error prone system manual - ECAM		V				

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
195		Flaws in manufacturer quality control process - Engine sensors		V				
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		V				
198		Lack of English proficiency		V			V	
199		Incorrect or confusing / misleading ATC instructions		V			V	
200		Use of non-standard phraseology by pilot and/or controller		V			V	
201		Traffic controller tiredness - Inadequate workload distribution		V			V	
202		Flaws in traffic controller requirements definition process and/or training methodology		V			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.					V	
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					V	
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					V	
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 / clearance					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					V	
218		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver					V	
219		Takeoff without clearance					V	
220		Landing without clearance					V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			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 manoeuvre execution - flare		V				
232		Lack of adherence to SOP for GND movements.		V				
233		Error in calculation of necessary amount of fuel		V				
234		Lack of adherence to emergency procedures - flight deck smoke procedure		V				
235		Extreme operation condition / poor maintenance quality / advanced life length		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		V				
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.		V				
239		Lack of adherence to emergency procedures - control recovery						V
240		Flaws in manufacturer quality control process - CPCS system and / or components		V				
241		Flaws in aircraft system maintenance process definition - CPCS system and / or components		V				
242		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - CPCS system and / or components		V				
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.					V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			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					V	
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				
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	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		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		V			V	V
139		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - 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	V	
142		Lack of or poor communication quality	V		V	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		V	V

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
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			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		V			V	V
153		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		V			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		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		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 components		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			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 in the 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				

No.	Safety Performance Indicators	Precursors	Operational issue					
			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				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			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		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		Hearback omitted	V			V		
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		V	V			

No.	Safety Performance Indicators	Precursors	Operational issue					
			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 / clearance	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		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				
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.		V				
210		Lack of adherence to emergency procedures - Fuel starvation		V				
211		Flaws in aircraft system maintenance process definition - Oil distribution system		V				
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				
214		Flaws in manufacturer quality control process - APU systems and / or components		V			V	
215		Flaws in manufacturer quality control process - Fire extinguishing system components		V		V	V	
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				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	V	

No.	Safety Performance Indicators	Precursors	Operational issue						
			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 airtside 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					
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.						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 immediate answer on supporting systems warning. Navigational aid failure.			V				
237		Not recognized ground Nav aids 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)			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 clearance 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.				V	V		
247		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance				V	V		

No.	Safety Performance Indicators	Precursors	Operational issue					
			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	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				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		V			V	
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				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				

No.	Safety Performance Indicators	Precursors	Operational issue					
			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				V	
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)				V		
282		Flaws in conflict and separation minima infringement detection / elimination procedures				V		
283		Lack of adherence of airlines to time constraints 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		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		
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 calibration.				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 separation				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		

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
299		Excessive pitch attitude		V				
300		Excessive bank angle		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		V				
303		DME / ILS DME confusion in assessing the final descent point / FAF		V				V
304		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components		V			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				V
307		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System.		V				V
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 inappropriate 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					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			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	

No.	Safety Performance Indicators	Precursors	Operational issue					
			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				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			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						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			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		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		

No.	Safety Performance Indicators	Precursors	Operational issue					
			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				V		
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			V	
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)					V	
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					V	
363		Inadequate effectiveness of fire extinguishing system		V				
364		Lack of adherence to the SOP in terms of critical manoeuvre 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					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		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				

No.	Safety Performance Indicators	Precursors	Operational issue					
			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		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		V				
387		Unintuitive and / or error prone system manual - fire extinguishing system		V				
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				V
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					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		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	

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
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				
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					V	
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.					V	
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					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				
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

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
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						
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 manoeuvre 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					V
452		Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain)			V				

No.	Safety Performance Indicators	Precursors	Operational issue					
			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		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 immediate 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			V	
469		Lack of adherence to AFM in terms of emergency procedures - engine failure		V				
470		Inadequate stall recovery procedure for the aircraft					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		

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
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	Total number of formal meetings of network of analysts to discuss safety performance measurement	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		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		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		V			V	V
139		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - 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	V	
142		Lack of or poor communication quality	V		V	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		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			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

No.	Safety Performance Indicators	Precursors	Operational issue						
			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	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		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	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		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	V	
160		Flaws in aircraft system maintenance process definition - Fuel system components		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	V	
163		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)		V	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				V
167		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components			V	V	V	V	
168		Flaws in manufacturer quality control process - Onboard navigational systems and components.			V	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 in the 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

No.	Safety Performance Indicators	Precursors	Operational issue					
			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		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 omitted	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		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				

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
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 / clearance	V				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				
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 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		V				
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		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				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	V	
223		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airtaxi 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		V				

No.	Safety Performance Indicators	Precursors	Operational issue						
			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.						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 immediate 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, ...)		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				
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 clearance 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.				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				V			
250		Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology				V			

No.	Safety Performance Indicators	Precursors	Operational issue					
			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		V			V	
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				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				V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			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		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)				V		
282		Flaws in conflict and separation minima infringement detection / elimination procedures				V		
283		Lack of adherence of airlines to time constraints 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		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		
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 calibration.				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 separation				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		V				
302		Flaws in aircraft system maintenance process definition - Anti-icing systems components		V				

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
303		DME / ILS DME confusion in assessing the final descent point / FAF		V				V
304		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components		V			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				V
307		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System.		V				V
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 inappropriate 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					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			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					

No.	Safety Performance Indicators	Precursors	Operational issue					
			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					V	
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			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						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			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		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				V		
351		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - STCA System				V		

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
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				V	
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)						V	
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						V	
363		Inadequate effectiveness of fire extinguishing system		V					
364		Lack of adherence to the SOP in terms of critical manoeuvre 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						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		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 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		V					

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
		with requirements - ASI							
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		V					
387		Unintuitive and / or error prone system manual - fire extinguishing system		V					
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					V
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						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		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 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					

No.	Safety Performance Indicators	Precursors	Operational issue						
			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						V	
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.						V	
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						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					
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					

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
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						
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 anti-ice 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 manoeuvre execution - flare		V					
449		Extreme operation condition / poor maintenance quality / advanced life length		V					
450		Incorrect use of automation - CPCS		V					
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				
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				

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
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			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 immediate 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			

No.	Safety Performance Indicators	Precursors	Operational issue					
			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	V	V		V	V
137		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	V	V	V		V	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			V
142		Lack of adherence to the main CRM rules		V	V			V
143		Incorrect use of automation - FMS		V	V			V
144		Unintuitive and / or error prone system manual - FMS		V	V			V
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 in the case of adverse weather.		V				V

No.	Safety Performance Indicators	Precursors	Operational issue						
			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					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			
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					V
161		Lack of adherence to SOP for GND movements.	V	V					
162		Hearback omitted	V			V			
163		Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airtaxi and airport topology.	V						
164		Aggressive maneuvering / overcontrolling		V					V
165		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.		V				V	V
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 / clearance	V						
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			

No.	Safety Performance Indicators	Precursors	Operational issue					
			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 immediate 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 clearance 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 airtaxi 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 constraints 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		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		V				
195		Lack of adherence to regulations concerning transport of DGR goods		V				
196		Flaws in aircraft system maintenance process definition - Fuel system components		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				

No.	Safety Performance Indicators	Precursors	Operational issue						
			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				V	
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 separation					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 calibration.					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					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		

No.	Safety Performance Indicators	Precursors	Operational issue					
			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				
229		Imbalanced and inappropriate relation between cpt and his subordinates			V			
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				
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					V	
240		Failure to remember / assess crosswind component limit for prevailing runway condition					V	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					
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, ...)		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				V

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
252		DME / ILS DME confusion in assessing the final descent point / FAF		V					V
253		Unstabilized final approach (high, fast, steep, ...)		V					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			
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					V
261		Lack of adherence to AFM limitations for landing		V					V
262		Flaws in aircraft system maintenance process definition - Fire extinguishing system components		V					
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		V					V
266		Inadequate effectiveness 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		V					
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						V	
273		Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations						V	
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						

No.	Safety Performance Indicators	Precursors	Operational issue					
			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						V
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	V					
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				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)			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			
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				

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
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 manoeuvre execution - flare		V				
307		Extreme operation condition / poor maintenance quality / advanced life length		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		V				
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 immediate 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		V				
314		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - CPCS system and / or components		V				
315		Incorrect use of automation - CPCS		V				
316		Late thrust reduction or power-on touchdown		V				V
317		Failure to arm ground-spoilers		V				V
318		Error in calculation of necessary amount of fuel		V				V
319		Lack of adherence to SOP in terms of necessary amount of fuel		V				V
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	
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		

No.	Safety Performance Indicators	Precursors	Operational issue						
			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			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				
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	V
132		Flaws in pilot requirements definition process and/or training methodology	V	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	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	V	V		V	V	
137		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	V	V	V		V	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				V
142		Lack of adherence to the main CRM rules		V	V				V
143		Incorrect use of automation - FMS		V	V				V
144		Unintuitive and / or error prone system manual - FMS		V	V				V
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			

No.	Safety Performance Indicators	Precursors	Operational issue						
			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				
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 in the 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					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			
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					V
161		Lack of adherence to SOP for GND movements.	V	V					
162		Hearback omitted	V			V			
163		Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airtaxi and airport topology.	V						
164		Aggressive maneuvering / overcontrolling		V					V
165		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.		V				V	V
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 / clearance	V						

No.	Safety Performance Indicators	Precursors	Operational issue						
			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 immediate 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 clearance 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 airtaxi 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 constraints 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		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		V					
195		Lack of adherence to regulations concerning transport of DGR goods		V					
196		Flaws in aircraft system maintenance process definition - Fuel system components		V					

No.	Safety Performance Indicators	Precursors	Operational issue						
			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					
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				V	
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 separation					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 calibration.					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		

No.	Safety Performance Indicators	Precursors	Operational issue					
			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 inappropriate relation between cpt and his subordinates			V			
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				
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					V	
240		Failure to remember / assess crosswind component limit for prevailing runway condition					V	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					

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
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, ...)		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					V
252		DME / ILS DME confusion in assessing the final descent point / FAF		V					V
253		Unstabilized final approach (high, fast, steep, ...)		V					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		
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					V
261		Lack of adherence to AFM limitations for landing		V					V
262		Flaws in aircraft system maintenance process definition - Fire extinguishing system components		V					
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		V					V
266		Inadequate effectiveness 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		V					
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						

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
272		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					V	
273		Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations					V	
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						V
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	V					
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				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)			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			

No.	Safety Performance Indicators	Precursors	Operational issue						
			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 manoeuvre execution - flare		V					
307		Extreme operation condition / poor maintenance quality / advanced life length		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		V					
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 immediate 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		V					
314		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - CPCS system and / or components		V					
315		Incorrect use of automation - CPCS		V					
316		Late thrust reduction or power-on touchdown		V					V
317		Failure to arm ground-spoilers		V					V
318		Error in calculation of necessary amount of fuel		V					V
319		Lack of adherence to SOP in terms of necessary amount of fuel		V					V
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	

No.	Safety Performance Indicators	Precursors	Operational issue					
			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						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			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			
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	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		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		V			V	V

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
139		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.		V			V	V
140		Lack of adherence to SOP in terms of approach and landing		V	V			V
141		Unintuitive and / or error prone system manual - CPCS		V			V	V
142		Lack of adherence to the SOP in terms of critical indicators cross-checking		V	V			
143		Flaws in CRM training procedures		V	V		V	V
144		Lack of adherence to the main CRM rules		V	V		V	V
145		Incorrect use of automation - FMS		V	V			V
146		Unintuitive and / or error prone system manual - FMS		V	V			V
147		Lack of or poor communication quality	V		V	V	V	
148		Aggressive maneuvering / overcontrolling		V				V
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		V			V	V
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	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		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 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 components		V				
162		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)		V	V	V	V	
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				V

No.	Safety Performance Indicators	Precursors	Operational issue						
			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 in the 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	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 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				
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		V					
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.		V					
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.		V					
188		Flaws in manufacturer quality control process - Landing gear components.		V					
189		Flaws in aircraft system maintenance process definition - Engine systems and / or components		V				V	

No.	Safety Performance Indicators	Precursors	Operational issue						
			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					
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					
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					
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.		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		V					
210		Flaws in manufacturer quality control process - Oil distribution system		V					
211		Flaws in manufacturer quality control process - Fire extinguishing system components		V		V	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					

No.	Safety Performance Indicators	Precursors	Operational issue					
			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		V			V	
217		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	V				V	
218		Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airtaxi and airport topology.	V				V	
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		V				
224		Flaws in manufacturer quality control process - Engine turbine components		V				
225		Hearback omitted	V			V		
226		Flaws in aircraft system maintenance process definition - Electrical wiring System		V			V	
227		Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.					V	
228		Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.					V	
229		Incorrect stab-trim setting					V	
230		Lack of adherence to Rules of the Air - adherence to Controller clearance				V	V	
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 airtaxi or / and aircraft / vehicle proximity	V				V	
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, ...)		V				V
235		Late deceleration and configuration set-up for approach and landing		V				V
236		Lack of adherence to SOP. Lack of awareness and immediate 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		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance			V			

No.	Safety Performance Indicators	Precursors	Operational issue					
			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	V	
242		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.				V	V	
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 clearance instruction			V			
245		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components		V			V	
246		Flaws in aircraft system maintenance process definition - Hydraulic System		V			V	
247		Poor application of T/O & RTO procedure, aircraft handling					V	
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	V	
250		Flaws in Airspace and Air Traffic planning procedures design process				V	V	
251		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components		V			V	
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					V	
254		Flaws in aircraft system maintenance process definition - Fire detection system components		V			V	
255		Flaws in manufacturer quality control process - Fire detection system components		V			V	
256		Flaws in aircraft system maintenance process definition - Fire warning system		V			V	
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			V	
259		Lack of adherence to AFM limitations for Take-off		V			V	
260		Unstabilized final approach (high, fast, steep, ...)		V				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				V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			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				V	
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					V	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				V	
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		V				
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				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				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		

No.	Safety Performance Indicators	Precursors	Operational issue					
			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				V		
292		Lack of adherence of airlines to time constraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data.				V		
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		
296		Lack of adherence to SOP for Airborne operation in terms of minimum separation				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		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				V
304		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components		V			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				V
307		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System.		V				V
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 inappropriate 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		V				V

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
		with requirements - LLWAS system						
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		Lack of adherence to SOP in terms of aircraft icing (condition) monitoring		V				V
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				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					V
323		Late rejected takeoff decision / initiation						V
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		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		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				

No.	Safety Performance Indicators	Precursors	Operational issue					
			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			V	
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		V				V
353		Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing		V			V	
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)					V	
358		Lack of adherence to emergency procedures - RWY collision avoidance	V					
359		Incorrect use of automation - TOCW System					V	
360		Flaws in aircraft system maintenance process definition - TOCW System					V	
361		Unintuitive and / or error prone system manual - TOCW					V	
362		Inadequate effectiveness of fire extinguishing system		V				
363		Lack of adherence to the SOP in terms of critical manoeuvre execution		V				
364		Applied de-icing / anti-icing method is not sufficient for predicted conditions		V			V	
365		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System					V	
366		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance	V					

No.	Safety Performance Indicators	Precursors	Operational issue					
			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				
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		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		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		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				V
389		Delayed selection of reverse thrust		V				V
390		Inappropriate selection of autobrake mode for given runway length and condition		V				V
391		Poor application of T/O & RTO procedure, braking initiation sequence					V	

No.	Safety Performance Indicators	Precursors	Operational issue						
			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				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						V	
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.		V					

No.	Safety Performance Indicators	Precursors	Operational issue						
			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.						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		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		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 anti-ice protection		V					
443		Flaws in manufacturer quality control process - anti-ice fluid specifications (HOT)		V					

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
444		Lack of adherence to the SOP in terms of critical manoeuvre execution - flare		V				
445		Extreme operation condition / poor maintenance quality / advanced life length		V				
446		Failure to arm ground-spoilers		V				V
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 immediate 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				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				

No.	Safety Performance Indicators	Precursors	Operational issue					
			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					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 with requirements - GPWS system components			V			
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	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		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		V			V	V
139		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.		V			V	V

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
140		Lack of adherence to SOP in terms of approach and landing		V	V			V
141		Unintuitive and / or error prone system manual - CPCS		V			V	V
142		Lack of adherence to the SOP in terms of critical indicators cross-checking		V	V			
143		Flaws in CRM training procedures		V	V		V	V
144		Lack of adherence to the main CRM rules		V	V		V	V
145		Incorrect use of automation - FMS		V	V			V
146		Unintuitive and / or error prone system manual - FMS		V	V			V
147		Lack of or poor communication quality	V		V	V	V	
148		Aggressive maneuvering / overcontrolling		V				V
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		V			V	V
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	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		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 components		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 manufacturer quality control process - FMS subsystem and components (autopilot incl.)		V	V	V	V	
162		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)		V	V	V	V	
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				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			V

No.	Safety Performance Indicators	Precursors	Operational issue						
			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 in the 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	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 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				
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		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 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.		V					
189		Flaws in aircraft system maintenance process definition - Engine systems and / or components		V				V	
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					

No.	Safety Performance Indicators	Precursors	Operational issue					
			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				
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				
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.		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		V				
210		Flaws in manufacturer quality control process - Oil distribution system		V				
211		Flaws in manufacturer quality control process - APU systems and / or components		V			V	
212		Flaws in manufacturer quality control process - Fire extinguishing system components		V		V	V	
213		Flaws in aircraft system maintenance process definition - ECAM (or similar) system components.		V				
214		Unintuitive and / or error prone system manual - Engine anti-icing system		V				
215		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ECAM.		V				

No.	Safety Performance Indicators	Precursors	Operational issue					
			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 / clearance	V				V	
218		Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.	V				V	
219		Flaws in aircraft system maintenance process definition - Electrical wiring System		V			V	
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		V				
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 omitted	V			V		
227		Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.					V	
228		Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.					V	
229		Incorrect stab-trim setting					V	
230		Lack of adherence to Rules of the Air - adherence to Controller clearance				V	V	
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				V	
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, ...)		V				V
235		Late deceleration and configuration set-up for approach and landing		V				V
236		Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. Navigational aid failure.			V			
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		V			V	
239		Flaws in aircraft system maintenance process definition - Hydraulic System		V			V	
240		Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS)			V			

No.	Safety Performance Indicators	Precursors	Operational issue					
			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	V	
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 clearance instruction			V			
247		Poor application of T/O & RTO procedure, aircraft handling					V	
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	V	
250		Flaws in Airspace and Air Traffic planning procedures design process				V	V	
251		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components		V			V	
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					V	
254		Flaws in aircraft system maintenance process definition - Fire detection system components		V			V	
255		Flaws in manufacturer quality control process - Fire detection system components		V			V	
256		Flaws in aircraft system maintenance process definition - Fire warning system		V			V	
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			V	
259		Lack of adherence to AFM limitations for Take-off		V			V	
260		Unstabilized final approach (high, fast, steep, ...)		V				V
261		Inadvertent deviation from cleared taxi route	V					
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		V				

No.	Safety Performance Indicators	Precursors	Operational issue						
			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					V		
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	V
279		Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	V					V	
280		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Anti-icing system components		V					
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 calibration.					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		
290		Inadequate coordination between ATM centers and/or ATC sectors					V		
291		Flaws in conflict and separation minima infringement detection / elimination procedures					V		
292		Lack of adherence of airlines to time constraints and deadlines in terms of providing the Network Manager Operation Centre					V		

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
		with obligatory data.							
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			
296		Lack of adherence to SOP for Airborne operation in terms of minimum separation				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		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					V
304		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components		V				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					V
307		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System.		V					V
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 inappropriate 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						V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			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		V			V	
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			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				V	
323		Late rejected takeoff decision / initiation					V	
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		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		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				
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

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
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			V	
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		V				V
353		Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing		V			V	
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)					V	
358		Lack of adherence to emergency procedures - RWY collision avoidance	V					
359		Incorrect use of automation - TOCW System					V	
360		Flaws in aircraft system maintenance process definition - TOCW System					V	
361		Unintuitive and / or error prone system manual - TOCW					V	
362		Inadequate effectiveness of fire extinguishing system		V				
363		Lack of adherence to the SOP in terms of critical manoeuvre execution		V				
364		Applied de-icing / anti-icing method is not sufficient for predicted conditions		V			V	
365		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System					V	
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				

No.	Safety Performance Indicators	Precursors	Operational issue						
			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		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 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		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		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					V
389		Delayed selection of reverse thrust		V					V
390		Inappropriate selection of autobrake mode for given runway length and condition		V					V
391		Poor application of T/O & RTO procedure, braking initiation sequence						V	
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					

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
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				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						V	
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.		V					
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					

No.	Safety Performance Indicators	Precursors	Operational issue					
			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.					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		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		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 airtside 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 manoeuvre execution - flare		V				
445		Extreme operation condition / poor maintenance quality / advanced life lenght		V				

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
446		Failure to arm ground-spoilers		V					V
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 immediate 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					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	

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
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				
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	V
132		Flaws in pilot requirements definition process and/or training methodology	V	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	V	V	V	V	V	V
136		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	V	V	V	V	V	V	V
137		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	V	V	V	V	V	V	V
138		Lack of or poor communication quality	V		V	V	V		
139		Use of non-standard phraseology by pilot and/or controller	V	V	V	V	V		
140		Lack of English proficiency	V	V	V	V	V		
141		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	V		V	V	V		

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
142		Flaws in CRM training procedures		V	V		V	V
143		Lack of adherence to the main CRM rules		V	V		V	V
144		Lack of adherence to SOP in terms of approach and landing		V	V			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	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.)			V	V	V	
149		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components			V	V	V	
150		Flaws in manufacturer quality control process - Onboard navigational systems and components.			V	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.		V	V			V
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	V	
155		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)			V	V	V	
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 in the 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 omitted	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	V	V	
163		Flaws in manufacturer quality control process - Fire extinguishing system components		V		V	V	
164		Lack of adherence to Rules of the Air - adherence to Controller clearance				V	V	
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				V	
167		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	V				V	

No.	Safety Performance Indicators	Precursors	Operational issue						
			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 airtaxi 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 immediate 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					V
177		Lack of adherence to SOP for AIR operations in terms of controller error in approach clearance 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).			V				
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.				V	V		
181		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.				V	V		
182		Flaws in manufacturer quality control process - Communication equipment systems and components.				V	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	V					
190		Navigation deviation				V	V		
191		Takeoff without clearance	V					V	
192		Landing without clearance	V					V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			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			V	
194		Inadvertent deviation from cleared taxi route	V					
195		Inadequate coordination between ATM centers and/or ATC sectors				V		
196		Flaws in aircraft system maintenance process definition - Fire detection system components		V			V	
197		Flaws in manufacturer quality control process - Fire detection system components		V			V	
198		Flaws in aircraft system maintenance process definition - Fire warning system		V			V	
199		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system		V			V	
200		Flaws in manufacturer quality control process - Fire warning system		V			V	
201		Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	V				V	
202		Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	V				V	
203		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.		V			V	
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		V			V	V
208		Lack of adherence to SOP in terms of fuelling procedure		V				
209		Flaws in aircraft system maintenance process definition - Electrical wiring System		V				
210		Altitude deviation				V		
211		Level bust (pilot lapse or late re-clearance by ATC)				V		
212		Flaws in conflict and separation minima infringement detection / elimination procedures				V		
213		Lack of adherence of airlines to time constraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data.				V		
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				

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
218		Flaws in manufacturer quality control process - Engine systems and / or components		V					
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		V					
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		V					
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 separation				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 calibration.				V			
236		Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications	V					V	
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.		V					
238		Imbalanced and inappropriate 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		V				V	
242		Callsign confusion	V						

No.	Safety Performance Indicators	Precursors	Operational issue					
			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				V
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				V
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				V
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		V			V	
261		Inadequate effectiveness 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.		V				
263		Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.		V				
264		Flaws in manufacturer quality control process - Integrity of primary aircraft structure.		V				
265		Unintuitive and / or error prone system manual - fire extinguishing system		V				
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)	V					

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
268		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					V	
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				
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					V	
274		Flaws in airport capacity management process					V	
275		Lack of adherence to SOP for take-off procedure in terms of time limitation for take-off preparation.					V	
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		V				
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		V				
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.					V	
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.					V	
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		V				
292		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - On-board weather radar		V				

No.	Safety Performance Indicators	Precursors	Operational issue						
			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.	V						
296		Late rejected takeoff decision / initiation						V	
297		Flaws in manufacturer quality control process - Landing gear components.		V					
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	V						
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				V	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 manoeuvre execution - flare		V					
317		Extreme operation condition / poor maintenance quality / advanced life length		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					

No.	Safety Performance Indicators	Precursors	Operational issue						
			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 immediate 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		V					
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					V
331		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment						V	
332		Poor application of T/O & RTO procedure, braking initiation sequence						V	
333		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.						V	
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						V	
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		

No.	Safety Performance Indicators	Precursors	Operational issue					
			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	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		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		V	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	V	V
144		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	V	V	V	V	V	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	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.)			V	V	V	
149		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components			V	V	V	
150		Flaws in manufacturer quality control process - Onboard navigational systems and components.			V	V	V	

No.	Safety Performance Indicators	Precursors	Operational issue						
			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				V
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	V		
155		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)			V	V	V		
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 in the 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 omitted	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	V	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 airtaxi and airport topology.	V					V	
166		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	V					V	
167		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airtaxi or / and aircraft / vehicle proximity	V					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 immediate 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

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
176		Lack of adherence to SOP for AIR operations in terms of controller error in approach clearance 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	V	
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	V	
186		Takeoff without clearance	V				V	
187		Landing without clearance	V				V	
188		Flaws in manufacturer quality control process - Fire extinguishing system components				V	V	
189		Inadvertent deviation from cleared taxi route	V					
190		Inadequate coordination between ATM centers and/or ATC sectors				V		
191		Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	V				V	
192		Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	V				V	
193		Unintuitive and / or error prone system manual - CPCS		V			V	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 constraints 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		

No.	Safety Performance Indicators	Precursors	Operational issue					
			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 separation				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				V		
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 calibration.				V		
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 inappropriate relation between cpt and his subordinates			V			
212		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components		V			V	V
213		Callsign confusion	V					
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				V
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				V
222		DME / ILS DME confusion in assessing the final descent point / FAF		V				V
223		Unstabilized final approach (high, fast, steep, ...)		V				V
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				V		
226		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - STCA System				V		

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
227		Go-around attempt after thrust reversers deployment		V				V
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					V	
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.					V	
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		V				
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		V				
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	

No.	Safety Performance Indicators	Precursors	Operational issue					
			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					V	
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					V	
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					V	
268		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components					V	
269		Flaws in manufacturer quality control process - Fire detection system components					V	
270		Flaws in aircraft system maintenance process definition - Fire warning system					V	
271		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system					V	
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					V	
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					V	

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
277		Flaws in manufacturer quality control process - Landing gear components.		V					
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.	V						
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				V	V
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 manoeuvre 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		V					
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			V				
301		Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. MSAW warning.			V				
302		Flaws in manufacturer quality control process - CPCS system and / or components		V					

No.	Safety Performance Indicators	Precursors	Operational issue					
			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		V				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				V
311		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment						V
312		Poor application of T/O & RTO procedure, braking initiation sequence						V
313		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.						V
314		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.						V
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				V
317		Poor application of T/O & RTO procedure, computation of T/O parameters						V
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			

No.	Safety Performance Indicators	Precursors	Operational issue					
			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	V	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			V	V
137		Traffic controller tiredness - Inadequate workload distribution	V	V	V	V		V
138		Flaws in traffic controller requirements definition process and/or training methodology	V	V	V	V		V
139		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.		V			V	V
140		Lack of adherence to SOP in terms of approach and landing		V	V			V
141		Lack of adherence to the SOP in terms of critical indicators cross-checking		V	V			
142		Incorrect use of automation - FMS		V	V			V
143		Unintuitive and / or error prone system manual - FMS		V	V			V
144		Unintuitive and / or error prone system manual - CPCS		V			V	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		V			V	V
152		Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	V		V	V		
153		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		V			V	V
154		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance		V			V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
		with requirements - Engine systems and / or components						
155		Inadequate aircraft de-icing / anti-icing		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 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 components		V				
162		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)		V	V	V	V	
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				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			V
166		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
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 the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path		V				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 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		Incorrect or confusing / misleading ATC instructions	V	V		V		
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

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
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		V				
182		Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure		V				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.		V				
187		Flaws in manufacturer quality control process - Landing gear components.		V				
188		Flaws in aircraft system maintenance process definition - Engine systems and / or components		V			V	
189		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision					V	
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				
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				
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				
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				

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
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.		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		V				
210		Flaws in manufacturer quality control process - Oil distribution system		V				
211		Flaws in manufacturer quality control process - Fire extinguishing system components		V		V	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 omitted	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		V				
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		V			V	
225		Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.					V	
226		Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.					V	
227		Incorrect stab-trim setting					V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			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, ...)		V				V
230		Late deceleration and configuration set-up for approach and landing		V				V
231		Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. Navigational aid failure.			V			
232		Not recognized ground NavAids System failure not reflected in NOTAM messages			V			
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			
236		Lack of adherence to SOP for GND movements.	V	V				
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 clearance 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 detection 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			V	V
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		V			V	
250		Flaws in manufacturer quality control process - Fire detection system components		V			V	
251		Flaws in aircraft system maintenance process definition - Fire warning system		V			V	
252		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance		V			V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
		with requirements - Fire warning system						
253		Flaws in manufacturer quality control process - Fire warning system		V				V
254		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	V					
255		Lack of adherence to AFM limitations for Take-off		V				V
256		Unstabilized final approach (high, fast, steep, ...)		V				V
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 airtaxi and airport topology.	V					
260		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airtaxi 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.					V	
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
268		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Electrical / wiring system components		V				
269		Flaws in manufacturer quality control process - Electrical / wiring systems components		V				
270		Lack of adherence to SOP in terms of fuelling procedure		V				
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		V				
273		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Anti-icing system components		V				
274		Lack of adherence to engine limitations		V				
275		Lack of adherence to SOP for take-off procedure in terms of altimeter calibration.					V	
276		Military activity in controlled airport or located within controlled area					V	
277		General aviation activity in controlled airport or located within controlled area					V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			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 constraints 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 separation				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		V				
298		DME / ILS DME confusion in assessing the final descent point / FAF		V				V
299		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components		V			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		V				V
302		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System.		V				V
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.		V				

No.	Safety Performance Indicators	Precursors	Operational issue					
			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				V
308		Imbalanced and inappropriate 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				V
310		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - LLWAS system		V				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					V	
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			V	
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	V					
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.	V				V	
323		Descent above desired descent profile		V				V
324		Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	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		Lack of adherence to AFM limitations for landing		V				V

No.	Safety Performance Indicators	Precursors	Operational issue						
			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					
341		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of STCA System.					V		
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					
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					V
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)						V	
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						V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
355		Inadequate effectiveness of fire extinguishing system		V				
356		Lack of adherence to the SOP in terms of critical manoeuvre 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					V	
360		Unintuitive and / or error prone system manual - Anti-icing system		V				
361		Lack of adherence to SOP in terms of pre-flight inspections -presence of anti-contamination covers on pitot static tube		V				
362		Lack of adherence to SOP in terms of briefing and checklist before initiating of start of taxiing and take-off		V				
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		V				
365		Flaws in aircraft system maintenance process definition - Pitot static systems components		V				
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		V				
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		V				
372		Flaws in aircraft system maintenance process definition - ASI		V				
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		V				
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		V				
378		Flaws in aircraft system maintenance process definition - Engine fuel distribution system		V				
379		Unintuitive and / or error prone system manual - fire extinguishing system		V				

No.	Safety Performance Indicators	Precursors	Operational issue						
			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					V
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		V					
400		Flaws in aircraft system maintenance process definition - stickshaker		V				V	
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		V				V	
404		High energy RTO rate is an indicator of improper Operator's policy for T/O operations.						V	

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
405		Lack of adherence to SOP in terms of providing flight crew with current weather report		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 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					
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.		V					
417		Inadequate crosswind landing / decrab technique							V
418		Touchdown off centerline							V
419		Inappropriate use of differential reverse thrust							V
420		Lack of adherence to SOP in terms of pre-flight inspections - cargo securing quality		V					
421		Inadequate use of differential braking							V
422		Use of nose wheel steering tiller during rollout							V
423		Lack of adherence to SOP in terms of awareness on supporting systems (warning) - RIMCAS.	V						
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)						V	
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						V	
429		Error in calculation of necessary amount of fuel		V					V
430		Lack of adherence to SOP in terms of load sheet preparation and verification		V					

No.	Safety Performance Indicators	Precursors	Operational issue					
			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						V
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 manoeuvre execution - flare		V				
440		Extreme operation condition / poor maintenance quality / advanced life length		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		V				
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.		V				
455		Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. MSAW warning.			V			
456		Flaws in manufacturer quality control process - CPCS system and / or components		V				

No.	Safety Performance Indicators	Precursors	Operational issue						
			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					V	
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		V					
465		Flaws in manufacturer quality control process - TOCW system components						V	
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						V	
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					V		
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	V	V	V
132		Flaws in pilot requirements definition process and/or training methodology	V	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	V

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
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		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		V			V	V
139		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - 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	V	
142		Lack of or poor communication quality	V		V	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		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			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		V			V	V
153		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		V			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		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		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	

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
160		Flaws in aircraft system maintenance process definition - Fuel system components		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			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 in the 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			V	
184		Flaws in aircraft system maintenance process definition - APU systems and / or components		V			V	

No.	Safety Performance Indicators	Precursors	Operational issue						
			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 airtaxi 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 omitted	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		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 / clearance	V					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					

No.	Safety Performance Indicators	Precursors	Operational issue					
			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			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.		V				
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				
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.					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			

No.	Safety Performance Indicators	Precursors	Operational issue					
			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 immediate 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, ...)		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			
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 clearance 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.				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				V		
250		Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology				V		
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 detection 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	

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
260		Flaws in manufacturer quality control process - Fire detection system components		V			V	
261		Flaws in aircraft system maintenance process definition - Fire warning system		V			V	
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				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				V	
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)				V		
282		Flaws in conflict and separation minima infringement detection / elimination procedures				V		
283		Lack of adherence of airlines to time constraints 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				

No.	Safety Performance Indicators	Precursors	Operational issue					
			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					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		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				V
304		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components		V			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				V
307		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System.		V				V
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	

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
312		Flaws in manufacturer quality control process - PWS system components		V				V
313		Imbalanced and inappropriate 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					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			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					V	
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			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					

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
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							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				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		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					V		
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				V	
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)						V	
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						V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
363		Inadequate effectiveness of fire extinguishing system		V				
364		Lack of adherence to the SOP in terms of critical manoeuvre 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					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		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 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		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		V				
387		Unintuitive and / or error prone system manual - fire extinguishing system		V				

No.	Safety Performance Indicators	Precursors	Operational issue					
			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				V
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					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		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 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				
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					V	
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.					V	
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				

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
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					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				
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		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				

No.	Safety Performance Indicators	Precursors	Operational issue						
			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 manoeuvre 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					V
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		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	

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
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 with requirements - GPWS system components				V			
483		Flaws in manufacturer quality control process - GPWS system components				V			
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	V	V	V	V	V
132		Flaws in pilot requirements definition process and/or training methodology	V	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	V
134		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	V	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	V

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
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		V			V	V
139		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - 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	V	
142		Lack of or poor communication quality	V		V	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		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			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		V			V	V
153		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		V			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		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		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 components		V				
161		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fuel system components		V				

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
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 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		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			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 in the 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			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				

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
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 airside 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 omitted	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		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 / clearance	V				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				
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	

No.	Safety Performance Indicators	Precursors	Operational issue					
			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		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			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.		V				
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 airtaxi 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				
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.					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 immediate answer on supporting systems warning. Navigational aid failure.			V			

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
237		Not recognized ground Nav aids 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)			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 clearance 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.				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				V			
250		Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology				V			
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		V				V	

No.	Safety Performance Indicators	Precursors	Operational issue						
			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					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					V	
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)					V		
282		Flaws in conflict and separation minima infringement detection / elimination procedures					V		
283		Lack of adherence of airlines to time constraints 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		V					
287		Failure to remember / assess crosswind component limit for prevailing runway condition						V	V

No.	Safety Performance Indicators	Precursors	Operational issue					
			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		V				
291		Lack of adherence to SOP for take-off procedure in terms of altimeter calibration.				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 separation				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		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				V
304		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components		V			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				V
307		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System.		V				V
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 inappropriate relation between cpt and his subordinates			V			

No.	Safety Performance Indicators	Precursors	Operational issue					
			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				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	
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			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					V	
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			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	

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
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			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		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				V		
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			V	
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)					V	
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					V	
363		Inadequate effectiveness of fire extinguishing system		V				
364		Lack of adherence to the SOP in terms of critical manoeuvre execution		V				

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
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						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		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 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		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		V					
387		Unintuitive and / or error prone system manual - fire extinguishing system		V					
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

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
390		Delayed selection of reverse thrust		V					V
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						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		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 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					
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						V	
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.						V	
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					

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
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				
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		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					

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
442		Lack of adherence to ICAO Annex 14 and related documents in terms of nonrestricted view on airtside 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 manoeuvre 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				V
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		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 immediate 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

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
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 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	V	V	V	V
132		Flaws in pilot requirements definition process and/or training methodology	V	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	V
134		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	V	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	V
136		Traffic controller tiredness - Inadequate workload distribution	V	V	V	V	V	V	V
137		Flaws in traffic controller requirements definition process and/or training methodology	V	V	V	V	V	V	V
138		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance		V				V	V

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
		with requirements - Landing gear components						
139		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.		V			V	V
140		Lack of adherence to SOP in terms of approach and landing		V	V			V
141		Unintuitive and / or error prone system manual - CPCS		V			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	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		V	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	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		V			V	V
153		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		V			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		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		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 components		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	

No.	Safety Performance Indicators	Precursors	Operational issue					
			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				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			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 in the 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		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			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 airtaxi and airport topology.	V				V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
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		Hearback omitted	V			V		
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	V			
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.	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		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				
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.		V				
210		Lack of adherence to Rules of the Air - adherence to Controller clearance				V	V	
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		V				

No.	Safety Performance Indicators	Precursors	Operational issue					
			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			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 / clearance	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.		V				
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 airtaxi 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				
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.					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 immediate 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

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
		or challenging ATC instructions (late descent, vectors, altitude or speed restrictions, ...)							
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				
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 clearance 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.				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				V			
250		Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology				V			
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		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	

No.	Safety Performance Indicators	Precursors	Operational issue					
			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		V				
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		V				
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	
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)				V		
282		Flaws in conflict and separation minima infringement detection / elimination procedures				V		
283		Lack of adherence of airlines to time constraints 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		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		

No.	Safety Performance Indicators	Precursors	Operational issue					
			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		V				
291		Lack of adherence to SOP for take-off procedure in terms of altimeter calibration.				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 separation				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		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				V
304		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components		V			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				V
307		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System.		V				V
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 inappropriate 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

No.	Safety Performance Indicators	Precursors	Operational issue						
			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	
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				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						V	
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				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		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					

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
340		Flaws in aircraft system maintenance process definition - Engine sensors		V				
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			V	
345		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - antiice fluid HOT		V			V	
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				
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				V		
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			V	
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)					V	
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					V	
363		Inadequate effectiveness of fire extinguishing system		V				
364		Lack of adherence to the SOP in terms of critical manoeuvre execution		V				
365		Applied de-icing / anti-icing method is not sufficient for predicted conditions		V			V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			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		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				
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		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		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		V				
387		Unintuitive and / or error prone system manual - fire extinguishing system		V				
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				V

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
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						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		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 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					
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						V	
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.						V	
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						V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			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						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					
442		Lack of adherence to ICAO Annex 14 and related documents in terms of nonrestricted view on airsite from TWR	V					

No.	Safety Performance Indicators	Precursors	Operational issue						
			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					
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 manoeuvre 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					V
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		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	

No.	Safety Performance Indicators	Precursors	Operational issue						
			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			V				
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					
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			V				
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	V	V	V
132		Flaws in pilot requirements definition process and/or training methodology	V	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	V
134		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	V	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	V
136		Traffic controller tiredness - Inadequate workload distribution	V	V	V	V	V	V	V
137		Flaws in traffic controller requirements definition process and/or training methodology	V	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		V			V	V	
139		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.		V			V	V	

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
140		Lack of adherence to SOP in terms of approach and landing		V	V			V
141		Lack of English proficiency	V	V	V	V	V	
142		Lack of or poor communication quality	V		V	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		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			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		V			V	V
153		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure		V			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		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		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 components		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	

No.	Safety Performance Indicators	Precursors	Operational issue						
			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	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 in the 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				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	

No.	Safety Performance Indicators	Precursors	Operational issue					
			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 omitted	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		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 / clearance	V				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				
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				

No.	Safety Performance Indicators	Precursors	Operational issue					
			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		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.		V				
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 airtaxi 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				
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.					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 immediate 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, ...)		V				V
239		Late deceleration and configuration set-up for approach and landing		V				V

No.	Safety Performance Indicators	Precursors	Operational issue					
			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 clearance 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.				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				V		
250		Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology				V		
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		V			V	
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	

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
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				V	
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)				V		
282		Flaws in conflict and separation minima infringement detection / elimination procedures				V		
283		Lack of adherence of airlines to time constraints 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		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		
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				

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
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		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				V
304		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components		V			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				V
307		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System.		V				V
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 inappropriate 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	

No.	Safety Performance Indicators	Precursors	Operational issue					
			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				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			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					V	
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			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						V
340		Flaws in manufacturer quality control process - Engine sensors		V				
341		Flaws in aircraft system maintenance process definition - Engine sensors		V				

No.	Safety Performance Indicators	Precursors	Operational issue					
			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				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		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				V		
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			V	
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)					V	
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					V	
363		Inadequate effectiveness of fire extinguishing system		V				
364		Lack of adherence to the SOP in terms of critical manoeuvre 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					V	
367		Incorrect use of automation - Anti-icing system		V				

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
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 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		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		V				
387		Unintuitive and / or error prone system manual - fire extinguishing system		V				
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				V
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					V	
393		Lack of adherence to SOP in terms of requested information support for other aircraft in terms of adverse weather		V				

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
		conditions							
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		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 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					
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						V	
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.						V	
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						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					

No.	Safety Performance Indicators	Precursors	Operational issue					
			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		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					
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					

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
		with requirements - RCWS						
445		Lack of adherence to TO procedure in terms of anti-ice 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 manoeuvre execution - flare		V				
449		Extreme operation condition / poor maintenance quality / advanced life length		V				
450		Incorrect use of automation - CPCS		V				
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			
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		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 immediate 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					

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
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 with requirements - GPWS system components			V			
483		Flaws in manufacturer quality control process - GPWS system components			V			
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	V	V	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		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		V			V	V
139		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.		V			V	V

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
140		Lack of English proficiency	V	V	V	V	V	
141		Lack of or poor communication quality	V		V	V	V	
142		Use of non-standard phraseology by pilot and/or controller	V	V	V	V	V	
143		Lack of adherence to the SOP in terms of critical indicators cross-checking		V	V			
144		Incorrect use of automation - FMS		V	V			V
145		Unintuitive and / or error prone system manual - FMS		V	V			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			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				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	V	V	V	
159		Flaws in aircraft system maintenance process definition - Fuel system components		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 manufacturer quality control process - FMS subsystem and components (autopilot incl.)		V	V	V	V	
162		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)		V	V	V	V	
163		Lack of adherence to SOP in terms of de-icing / anti-icing procedures.		V			V	
164		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components			V	V	V	
165		Flaws in manufacturer quality control process - Onboard navigational systems and components.			V	V	V	
166		Current airport diagram not reflecting critical changes	V		V			

No.	Safety Performance Indicators	Precursors	Operational issue						
			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				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.		V					
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		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		V					V
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				V
174		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
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				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		Lack of adherence to emergency procedures - control recovery		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						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		V					

No.	Safety Performance Indicators	Precursors	Operational issue						
			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.			V	V	V		
195		Lack of adherence to SOP for GND movements.	V	V					
196		Hearback omitted	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		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 / clearance	V				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					
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					

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
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.		V				
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 airtaxi 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				
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.					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 immediate 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 clearance instruction			V			

No.	Safety Performance Indicators	Precursors	Operational issue						
			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				V	
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				V	V
252		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components		V				V	
253		Takeoff without clearance	V					V	
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		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		Lack of adherence to AFM limitations for Take-off		V				V	
263		Inadequate coordination between ATM centers and/or ATC sectors					V		
264		Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	V					V	
265		Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	V					V	
266		Difference indications of independent aircraft speed / altitude or attitude indicators		V					

No.	Safety Performance Indicators	Precursors	Operational issue						
			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					V	
273		Unintuitive and / or error prone system manual - FMC						V	
274		Lack of adherence to SOP in terms of fuelling procedure		V					
275		Undetected incorrect takeoff configuration						V	
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 constraints 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 calibration.					V		
288		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MTCD System					V		
289		Lack of adherence of airlines to declared Flight Plan.					V		
290		Failure to identify the pre-tactical conflict before it reach the tactical controller					V		
291		Lack of adherence to SOP for Airborne operation in terms of minimum separation					V		

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
292		Military activity in controlled airport or located within controlled area				V		
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				V
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				V
302		Unstabilized final approach (high, fast, steep, ...)		V				V
303		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components		V			V	
304		Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling		V			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 inappropriate relation between cpt and his subordinates			V			
309		Flaws in aircraft system maintenance process definition - Fire extinguishing system components		V			V	
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				V	
314		Lack of adherence to SOP in terms of aircraft icing (condition) monitoring		V			V	
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	

No.	Safety Performance Indicators	Precursors	Operational issue					
			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					V	
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	
337		Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT)		V			V	
338		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - antiice fluid HOT		V			V	
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.				V		
342		Lack of adherence to regulations concerning independent ATCO monitoring				V		

No.	Safety Performance Indicators	Precursors	Operational issue					
			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				V		
344		Lack of adherence to AFM in terms of emergency procedures - fire detection and extinguishing procedure		V				
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				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				
349		Flaws in manufacturer quality control process - ADI system components		V				
350		Slow rotation (i.e., low pitch rate)					V	
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		Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared						V
355		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System.						V
356		Unintuitive and / or error prone system manual - TOCW					V	
357		Inadequate effectiveness of fire extinguishing system		V				
358		Lack of adherence to the SOP in terms of critical manoeuvre 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						V
364		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.						V
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		V				
368		Lack of adherence to SOP in terms of briefing and checklist before initiating of start of taxiing and take-off		V				

No.	Safety Performance Indicators	Precursors	Operational issue					
			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				
371		Flaws in aircraft system maintenance process definition - Pitot static systems components		V				
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				
375		Flaws in aircraft system maintenance process definition - ADI		V				
376		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ASI		V				
377		Flaws in manufacturer quality control process - ASI		V				
378		Flaws in aircraft system maintenance process definition - ASI		V				
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		V				
381		Flaws in aircraft system maintenance process definition - PFD		V				
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		V				
384		Flaws in aircraft system maintenance process definition - Engine fuel distribution system		V				
385		Unintuitive and / or error prone system manual - fire extinguishing system		V				
386		Flaws in aircraft system maintenance process definition - stickshaker		V	V		V	
387		Poor application of T/O & RTO procedure, braking initiation sequence					V	
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		V				
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				

No.	Safety Performance Indicators	Precursors	Operational issue						
			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.						V	
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		V					
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		V					
403		Flaws in airport capacity management process						V	
404		Unintuitive and / or error prone system manual - On-board weather radar.		V					
405		Incorrect use of automation - On-board weather radar		V					
406		Lack of adherence to SOP for take-off procedure in terms of time limitation for take-off preparation.						V	
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		V					
411		Lack of adherence to emergency procedures - WEM							V
412		Poor application of T/O & RTO procedure, computation of T/O parameters						V	
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.		V					
415		Flaws in manufacturer quality control process - Rudder components.		V					
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.		V					
418		Flaws in manufacturer quality control process - Horizontal stabilizer components.		V					
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					

No.	Safety Performance Indicators	Precursors	Operational issue						
			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							V
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					V
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.	V						
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 anti-ice 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 manoeuvre execution - flare		V					
440		Extreme operation condition / poor maintenance quality / advanced life length		V					
441		Incorrect use of automation - CPCS		V					
442		Late activation of pedal braking or takeover from autobrake, when so required		V					V
443		Delayed selection of reverse thrust		V					V
444		Inappropriate selection of autobrake mode for given runway length and condition		V					V
445		Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain)			V				

No.	Safety Performance Indicators	Precursors	Operational issue					
			1	2	3	4	5	6
446		Premature descent to DA(H) before G/S intercept or premature descent to MDA(H) before final-descent-point / FAF			V			
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			V			
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			V			
452		Failure to follow published missed-approach procedure			V			
453		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of MSAW system.			V			
454		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MSAW System			V			
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 immediate answer on supporting systems warning. MSAW warning.			V			
457		Inadequate stall recovery procedure for the aircraft	V				V	
458		Late thrust reduction or power-on touchdown		V				V
459		Failure to arm ground-spoilers		V				V
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				V
462		Flaws in manufacturer quality control process - Stickshaker system components		V			V	
463		Lack of adherence to AFM in terms of emergency procedures - engine failure		V				
464		Inadequate management / separation of takeoffs and landings	V					
465		Flaws in manufacturer quality control process - TOCW system components					V	
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		
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		V				

No.	Safety Performance Indicators	Precursors	Operational issue						
			1	2	3	4	5	6	
473		Inadequate crosswind landing / decrab technique							V
474		Touchdown off centerline							V
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]*

Table of Contents

- B. Details of Step 1 to 8 2
 - Step 1 – Association of CATS ESDs to EASp main Operational Issues 2
 - Step 2 – Association of precursors and defences/controls when possible..... 3
 - Step 3 – Link between updated precursors list and CATS ESDs (v0.1) 40
 - Step 4 – Link between defences/controls updated list and CATS ESD number 84
 - Step 5 – Link between defences/controls updated list and CATS ESD safety barriers 111
 - Step 6 - Link between precursors and CATS base events of safety barrier fault trees 142
 - Step 7 - Link between CATS base events of safety barrier fault trees and safety performance indicators 142
 - Step 8 - Link between precursors and safety performance indicators 142

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)	5-6-8-11-12-13-14-15-16-17-18-19-21-33-38
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

ESD	Initiating event	EASP category					
		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		v			v	
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		v				
13	Flight control system failure		v				
14	Flight crew incapacitation		v				
15	Anti-ice system not operating		v				
16	Flight instrument failure		v				
17	Aircraft encounters adverse weather		v				
18	Single engine failure		v				
19	Unstable approach		v				v
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						v
26	Aircraft handling by flight crew during roll inappropriate						v
27	Aircraft direction control related systems failure						v
28	Single engine failure during landing						
29	Thrust reverser failure during landing						
30	Aircraft encounters unexpected wind						
31	Aircraft are positioned on collision course				v		
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		v				

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 Events)	No.	Deviations (Procedural/Flight Path)	No.	DEFENCES/CONTROLS
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 encounter	20			Flight plan, weather forecast, weather 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, aircraft design
Uncommanded thrust asymmetry	28			Aircraft maintenance checks, aircraft 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, aircraft 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 transoceanic route or over rarely populated area	41			Pilot training, engine control system, engine design, engine maintenance
Convective weather / turbulence / windshear / crosswind / icing conditions encounter during approach and landing	42			Pilot training, weather forecast, flight plan, ATM guidance, navigation aids
Crew is incapable in result of shock related to hard landing	43			Seat design, pilot physical tests
Missed approach execution necessary after prolonged flight due to e. g. extreme weather	44			Pilot training, weather forecast, flight plan, 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, glideslope
Rejected takeoff (whether initiated below or above 100 kt) (+) due to an aircraft system failure including engine	48			Avionics maintenance, design
Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown	49			Pilot training, ILS, Tower guidance, fail-safe design

Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.	DEFENCES/CONTROLS
GPWS / TAWS alert / warning (genuine or spurious)	50			Pilot training, ATM and tower guidance, flight plan, Navigation aids
MSAW warning	51			Pilot training, ATM and tower guidance, flight plan, Navigation aids
Other cases of reduced terrain separation	52			Pilot training, ATM and tower guidance, flight plan, ILS
Prolonged loss of communications (PLOC) between pilot and controller(s)	53			Communication Systems maintenance and design,
Low-energy state during approach	54			Pilot training, fly-by-wire/light
Land short (runway undershoot) event	55			Pilot training, ILS, Tower guidance
Low altitude pattern following a go-around	56			Pilot training, Tower guidance, TCAS
Inappropriate low altitude maneuvering	57			Pilot training, Tower guidance, TCAS
Low-on-fuel condition / fuel starvation	58			Pilot training, flight planning, communication with ATM
Crew incapacitation resulted from illness (e.g. food poisoning)	59			Pilot health monitoring
Natural or artificial obstacle on runway course	60			Runway state monitoring
Error in preparation of database for FMS	61			Maintenance staff training, database 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 / windshear encounter conditions during landing	65			Tower guidance, wather forecast, pilot training
Midair collision	66			ATM guidance, radar, pilot training, procedures, transponder
Collision with ground obstacle	67			Runway state monitoring, TCAS, pilot training
Inadequate NOTAM information concerning ground navigational aid failure	68			ground installation maintenance
Inadequate navigational chart	69			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 occurrences 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 or takeoff from incorrect intersection	92			Pilot training, Tower guidance, sterile cockpit
Line-up events	93			Towe guidance, pilot training
Rejected takeoff (whether initiated below or above 100 kt) (+) due to an aircraft system failure including engine	48			Aircraft systems maintenance, checks, design
Aircraft swerve / lateral excursion during takeoff roll	96			Pilot traning, weather monitoring, fly-by-wire/light
Cautions / warnings (genuine or spurious) that may lead to a low-speed or high-speed rejected take-off	46			Avionics callibration, maintenance, design
Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll	98			Avionics callibration, maintenance, design
Runway incursion	99			Airport security
Wild life incursion	100			Wildlife deterrence program
Bird strike	34			Wildlife deterrence program
Convective weather / turbulence / windshear / crosswind encounter during approach and landing	102			Weather monitoring, Tower guidance, pilot training
Crew is incapable in result of shock related to hard landing	43			Seat design, pilot physical tests
Wild life incursion	100			Wildlife deterrence program
Convective weather / heavy rain	105			Weather monitoring, Tower guidance, pilot training
Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown	49			Fail-safe design
Missed approach execution necessary after prolonged flight	44			Weather monitoring, tower guidance, pilot 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 operation of primary instruments / displays or standby instruments	26			
Convective weather encounter	18			Weather monitoring, Flight plan, ATM/tower guidance, pilot training
Continued unstabilized approach (failure to comply with go-around criteria and policy)	13			Pilot training, aircraft tracking, tower guidance, navigational aids
Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly	116			Weather monitoring, Tower guidance, pilot training
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 control during rollout	120			Pilot training, aircraft design
System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)	15			System maintenance, checks, design
System failures that may affect directional control (brakes, thrust reversers, nose wheel steering)	122			System maintenance, checks, design
Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWY.	123			Pilot training, Tower guidance
Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure)	124			POA certificate, quality checks at factory and customer level
Lack of adherence to SOP for GND movements in terms of	125			Tower guidance, aircraft training, pilot training

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 communication.	126			Tower guidance, aircraft training, pilot training
Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	127			Tower guidance, aircraft training, pilot training
Flaws in ground equipment maintenance process	128			Maintenance operation organisation, audits, staff training
Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129			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 training
		Lack of English proficiency	132	Pilot qualification 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 training, 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 training, tower guidance, aircraft tracking
		Lack of adherence to SOP for GND movements.	141	Pilot training, tower guidance, aircraft tracking
		Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airside and airport topology.	142	Pilot training, tower guidance, aircraft tracking
		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	143	Pilot training, tower guidance, aircraft tracking
		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airside or / and aircraft / vehicle proximity	144	Pilot training, 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 requirements, 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 / airworthiness specialist tiredness - Inadequate workload distribution	150	State labor regulations, labor unions, ATM work organisation
		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151	Staff training
		Inadequate stall recovery procedure for the aircraft	152	Pilot training, fly-by-wire/light
		Inadequate management / separation of takeoffs and landings	153	ATM training, pilot training
		Callsign confusion	154	Alphabet pronunciation standards, staff training, communication equipment standards
		Current airport diagram not reflecting critical changes	155	CAA monitoring
		Lack of adherence to SOP in terms of awareness on supporting systems (warning) - RIMCAS.	156	Staff training
		Takeoff without clearance	157	Pilot training, pilot legal responsibility
		Landing without clearance	158	Pilot training, pilot legal responsibility
		Lack of adherence to emergency procedures - TWY / Apron collision avoidance	159	Pilot training, legal responsibility, tower guidance
		Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	160	Pilot training, legal responsibility, tower guidance
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - stickshaker	161	Multistage process acceptance, process update

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 airtaxi from TWR	166	State regulations, norms, audits, certification
		Pilot tiredness - Inadequate workload distribution	167	Air carrier organisation, state labour regulations, labour unions
		Flaws in pilot requirements definition process and/or training methodology	168	Voluntary reporting system, state authorities scrutiny
		Hearback omitted	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 System.	172	International and state regulations, norms, audits, certification and their updates
		Lack of adherence to emergency procedures - WEM	173	Staff training
		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	177	Pilot training, control design
		Inappropriate selection of autobrake mode for given runway length and condition	178	Pilot training, control design
		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment	179	Pilot training, system design, test, calibration
		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 Events)	No.	Deviations (Procedural/Flight Path)	No.	DEFENCES/CONTROLS
		turbulence conditions)		
		Excessive response to TCAS orders	188	Pilot training, fly-by-wire/light
		Inadequate recovery from aircraft upset (uncommanded pitch attitude or bank angle excursion)	189	Pilot training, fly-by-wire/light
		Low-energy state during descent and approach	190	Pilot training, fly-by-wire/light, ILS, tower guidance
		Inadequate response to stall warning, GPWS warning, low-energy alert (as applicable)	191	Pilot training, publications of accident reports
		Incorrect use of automation - TOCW System	192	Pilot training, publications of accident reports
		Go-around attempt after thrust reversers deployment	193	Pilot training, aircraft control design
		Lack of effective pitch attitude and/or bank angle control during go-around	194	Pilot training, fly-by-wire/light
		Inappropriate low altitude maneuvering	57	Pilot training, fly-by-wire/light
		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	Multistage process acceptance, process update
		Lack of adherence to SOP in terms of awareness on supporting systems warning - stickshaker	197	Staff training, tower guidance
		Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.	198	Staff training, tower guidance, cockpit design
		Poor application of T/O & RTO procedure, braking initiation	199	Pilot training, tower guidance

Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.	DEFENCES/CONTROLS
		sequence		
		Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling	200	Pilot training, tower guidance
		Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201	Pilot training, tower guidance
		Lack of adherence to AFM limitations for Take-off	202	Pilot training, aircraft control design
		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	CAA monitoring, EU and state regulations, voluntary reporting
		Flaws in aircraft system maintenance process definition - TOCW System	204	Multistage process acceptance, process update
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - RCWS	205	Multistage process acceptance, process update
		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	CAA monitoring, EU and state regulations, voluntary reporting
		Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207	Pilot training, tower guidance
		Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing	208	Pilot training, aircraft control design
		Poor application of T/O & RTO procedure, failure recognition and preparedness	209	Pilot training, tower guidance

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 maintenance - 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 effectiveness 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 manoeuvre 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 terms of aircraft icing monitoring	231	Pilot training, automation
		Lack of adherence to SOP in terms of de-icing / anti-icing procedures.	232	Pilot training, automation
		Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination	233	Staff training, audits, CAA monitoring, state norms and regulations
		Lack of adherence to SOP in terms of requested information support for other aircraft in terms of current weather conditions	234	Staff training, reporting
		Lack of adherence to SARPs in terms of avoiding adverse weather conditions during flight	235	Staff training, reporting, norms, CAA monitoring
		Incorrect weather report obtained by the flight crew	236	Weather forecast organisational quality assurance, forecast requirements, reliable source of forecasts
		Lack of adherence to SOP in terms of providing flight crew with current weather report	237	Staff training, reporting
		Flaws in manufacturer quality control process - Power supply system components	238	Certification, tests, norms
		Lack of adherence to SOP in terms of application of findings from weather report	239	Staff training
		Lack of adherence of passengers to the recommendation: Fasten seat belt while seated	240	Steward(ess) checks, request. Legal responsibility
		Lack of adherence to SOP in terms of "fasten your seat belt"	241	Staff training

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 amount of fuel	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 in the 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 process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system	253	Multistage process acceptance, process update
		Lack of adherence to SOP in terms of necessary amount of fuel	254	Staff training, certification
		Lack of adherence to SOP in terms of load sheet preparation and verification	255	Staff training, certification
		Lack of adherence to the current technology standards in terms of flight safety and efficiency.	256	International and state regulations, norms, audits, certification and their updates
		Lack of adherence to SOP in terms of AFM limitations in terms of weigh and balance	257	Staff training, certification
		Incorrect stab-trim setting	258	Staff training
		Undetected incorrect takeoff configuration	259	Computerised checklist, external aircraft ground crew checks
		Poor application of T/O & RTO procedure, computation of T/O parameters	260	Pilot training, software Q&A
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment	261	Multistage process acceptance, process update
		Gross error in takeoff weight entry and/or in V1 / VR speeds assessment	179	Staff training, software Q&A, error proof GUI
		Flaws in CRM training procedures	263	Reporting system, procedure updates and evalutaion
		Lack of adherence to the main CRM rules	264	Staff training
		Flaws in manufacturer quality control process - Stickshaker	266	Certification, Recipient test. Report system.

Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.	DEFENCES/CONTROLS
		system components		
		Difference indications of independent aircraft attitude indicators	267	Calibration, maintenance, pre-flight check.
		Flaws in aircraft system maintenance process definition - Braking system related components	268	Staff experience, reporting system, process evaluation and update
		Incorrect use of automation - FMS	269	Pilot training, fool-proof design
		Flaws in aircraft system maintenance process definition - Communication equipment systems and components.	270	Staff experience, reporting system, process evaluation and update
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.	271	Multistage process acceptance, process update
		Flaws in manufacturer quality control process - Communication equipment systems and components.	272	Staff experience, reporting system, process evaluation and update
		Lack of adherence to SOP in terms of safety best practices	273	Staff training
		Altimeter setting error	274	Calibration, maintenance, pre-flight check.
		Failure to check navigation accuracy before approach	275	Pilot training, routine
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Rudder components.	276	Multistage process acceptance, process update
		Flaws in aircraft system maintenance process definition	277	Staff experience, reporting system, process 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 awareness, communication between pilot and ATM
		Flaws in manufacturer quality control process - Rudder components.	279	Staff experience, reporting system, component 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 guidance, pilot instruments, training
		Premature descent below MDA(H) before reaching the visual-descent-point (VDP)	282	Aircraft tracking, ATM guidance, pilot instruments, training
		Flight below desired flight path during initial and/or final approach	283	ILS, glideslope, Aircraft tracking, Tower guidance, pilot instruments, training
		Continued approach, when below DA(H) or MDA(H), after loss of visual references	284	Aircraft tracking, Tower guidance, 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 required	289	Pilot training, communication with Tower, aircraft tracking
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ACAS system components	290	Multistage process acceptance, process update
		Failure to follow published missed-approach procedure	291	Pilot training, communication with Tower, aircraft tracking
		Lack of adherence to AFM in terms of emergency procedures - stall recovery	292	Pilot training
		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS	293	Certification, market pressure, CAA monitoring, regulations update
		Lack of adherence to SOP for take-off procedure in terms of altimeter callibration.	294	Staff training, staff cooperation
		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	National regulations update, CAA monitoring
		Lack of adherence to Rules of the Air - adherence to Controller clearance	296	Pilot training, staff training and cooperation
		Lack of adherence to TO procedure in terms of antiice protection	297	Pilot and maintenance training, staff cooperation
		Flaws in manufacturer quality control process - PWS system components	298	Certification of product and manufacturer, recipient test, reporting systems

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 - FMS subsystems and components (autopilot incl.)	299	Multistage process acceptance, process update
		Tactical or / and Planning Controller tiredness - Inadequate workload distribution	300	State labor regulations, labor unions, work organisation, safety culture
		Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology	301	Multistage process acceptance, process update
		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of MSAW system.	302	Certification, market pressure, CAA monitoring, regulations update
		Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. Navigational aid failure.	303	Staff training
		Imbalanced and inappropriate relation between cpt and his subordinates	304	Staff training, organisation culture, management monitoring
		Unintuitive and / or error prone system manual - communication equipment.	305	Quality assurance (e.g. FMEA), customer feedback, market pressure
		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)	306	Certification, Recipient test, reporting system
		Lack of adherence to SOP for AIR operations in terms of controller error in approach clearance instruction	307	Pilot and other staff training, staff cooperation

Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.	DEFENCES/CONTROLS
		Not recognized ground Nav aids System failure not reflected in NOTAM messages	308	Voluntary reporting systems, CAA cooperation with users
		Lack of adherence to SOP in terms of pre-flight inspections - ice presence on aircraft	309	Staff training, safety culture, pre-flight checks
		Flaws in manufacturer quality control process - anti-ice fluid specifications (HOT)	310	Certification, recipient tests
		Flaws in aircraft system maintenance process definition - Components of Wing control surface system.	311	Staff experience, safety culture, process evaluation and update
		Altitude deviation	312	Altitude monitoring, various sources of information for pilot and ATM
		Level bust (pilot lapse or late re-clearance by ATC)	313	Pilot and ATC training
		Flaws in manufacturer quality control process - Components of Wing control surface system.	314	Certification, recipient tests, audits
		Failure to comply with an altitude or speed restriction / constraint	315	Pilot training, notification in instrument
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine	316	Multistage process acceptance, process update
		Navigation deviation	317	Multiple information sources, GPS, nav beacons, ATM cooperation, pilot training
		Inappropriate visual avoidance maneuver	318	Pilot training
		Flaws in aircraft system maintenance process definition - ADI system components	319	Staff expertise, multistage process acceptance, process evaluation and update
		Inadequate certification process and / or flaws in methodology concerning verification of the system /	320	Multistage process acceptance, process update

Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.	DEFENCES/CONTROLS
		product compliance with requirements - ADI system components		
		Inadequate coordination between ATM centers and/or ATC sectors	321	Audits, periodic evaluation and update
		Flaws in manufacturer quality control process - ADI system components	322	Certification, recipient tests, audits
		Flaws in Airspace and Air Traffic planning procedures design process	323	Consultations on design stage, evaluation and update
		Flaws in manufacturer quality control process - Autothrottle system in the engine.	324	Certification, recipient tests, audits
		Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.	325	Staff expertise, multistage process acceptance, process evaluation and update
		Flaws in conflict and separation minima infringement detection / elimination procedures	326	Tests, evaluation, update
		Lack of adherence of airlines to time constraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data.	327	Pressure to get permissions for operations, market pressure
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MTCD System	328	National regulations update, CAA monitoring
		Lack of adherence of airlines to declared Flight Plan.	329	Very high pressure to avoid financial and loss of pax goodwill consequences
		Failure to identify the pre-tactical conflict before it reach the tactical controller	330	Staff training and experience
		Lack of adherence to SOP for Airborne operation in terms of minimum separation	331	Pilot training, aircraft tracking and ATM cooperation

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 - Thrust reverse system in the engine.	332	Multistage process acceptance, process update
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components	333	Multistage process acceptance, process update
		Flaws in aircraft system maintenance process definition - Hydraulic System	334	Staff expertise, multistage process acceptance, process evaluation and update
		Flaws in manufacturer quality control process - Thrust reverse system in the engine.	335	Certification, recipient test, audits
		Incorrect use of communication equipment	336	Staff training, fool-proof design
		Flaws in aircraft system maintenance process definition - Thrust reverse system in the engine.	337	Staff expertise, multistage process acceptance, process evaluation and update
		Lack of adherence to emergency procedures - recovery from severe FCS failure	338	Pilot training, equipment design, manual
		Military activity in controlled airport or located within controlled area	339	International agreements, government policies avoiding war, ATC airspace monitoring, civil cooperation with air force
		General aviation activity in controlled airport or located within controlled area	340	Airport tower airspace monitoring, transponders installed in GA aircraft
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with	341	Multistage process acceptance, process update

Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.	DEFENCES/CONTROLS
		requirements - Integrity of primary aircraft structure.		
		Intensified traffic related to general aviation activity e. g. over GA airport / airfield	342	Flight plan acceptance by authorities, AC airspace monitoring, transponers in GA aircraft
		Deviation from flight trajectory commanded by controller	343	Aircraft tracking by ATM, transponders, navigation aids, pilot training
		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of STCA System.	344	Certification, market pressure, regulations update, CAA monitoring
		Flaws in aircraft system maintenance and airworthiness process definition - Integrity of primary aircraft structure.	345	CAA monitoring, certification, staff experience
		Lack of adherence to regulations concerning independent ATCO monitoring	346	Staff training
		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ACAS installed on aircraft.	347	Certification, market pressure, regulations update, CAA monitoring
		Flaws in manufacturer quality control process - Integrity of primary aircraft structure.	348	Certification of product and manufacturer, market pressure, CAA monitoring, audits
		Late or inadequate response to ACAS warning	349	Staff training
		Lack of adherence to emergency procedures - flight deck smoke procedure	350	Staff training
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - STCA System	351	Multistage process acceptance, process update
		Inadequate certification process and / or flaws in	352	Multistage process acceptance, process 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 vulnerable aircraft parts or components	353	Maintenance staff training, audits
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements in terms of fire resistance	354	Multistage process acceptance, process update
		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.	355	Certification, market pressure, regulations update, CAA monitoring
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - LLWAS system	356	Multistage process acceptance, process update
		Lack of adherence to AFM in terms of emergency procedures - windshear recovery	357	Pilot training, instruments information aid
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358	Multistage process acceptance, process update
		Lack of adherence to regulations concerning transport of DGR goods	359	Staff training, certification, audits
		Separation of structural element / component of the	360	Aircraft certification, proper design, maintenance checks, maintenance

Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.	DEFENCES/CONTROLS
		aircraft during take-off or landing		certification
		Flaws in aircraft system maintenance process definition - Fuel System	361	Certification, regulations update
		Excessive taxi speed	362	Pilot training, aircraft tracking by tower staff
		Inadequate technique for line-up or 180-degree turn on runway	363	Pilot training, tower cooperation
		Inadequate engine stand-up technique	364	Staff training
		Flaws in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake).	365	Certification, market pressure
		Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake).	366	Certification, market pressure
		Taxiing without clearance	367	Pilot training, aircraft tracking by ATC
		Late rejected takeoff decision / initiation	368	Staff training
		Premature rotation (i.e., below VR)	369	Pilot training
		Late rotation (i.e., above VR)	370	Pilot training
		Slow rotation (i.e., low pitch rate)	371	Pilot training
		Low pitch attitude after lift-off	372	Pilot training
		Flaws in manufacturer quality control process - Pneumatic system components.	373	Certification of product and manufacturer, market pressure, CAA monitoring, audits
		Flaws in aircraft system maintenance process definition - Pneumatic system components.	374	CAA monitoring, certification, staff experience
		Inadequate certification process and / or flaws in methodology concerning	375	Multistage process acceptance, process update

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 control process - Landing gear components.	376	Certification of product and manufacturer, market pressure, CAA monitoring, audits
		Flaws in aircraft system maintenance process definition - Landing gear components.	377	CAA monitoring, certification, staff experience
		Flaws in manufacturer quality control process - Drag control system components.	378	Certification of product and manufacturer, market pressure, CAA monitoring, audits
		Flaws in aircraft system maintenance process definition - Drag control system components.	379	CAA monitoring, certification, staff experience
		Lack of adherence to SOP for GND movements. Inadequate application of call sign de-confliction rules	380	Pilot training, monitoring by ATC
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Drag control system components.	381	Multistage process acceptance, process update
		Flaws in manufacturer quality control process -other critical flight instruments and systems.	382	Certification of product and manufacturer, market pressure, CAA monitoring, audits
		Flaws in aircraft system maintenance process definition - other critical flight instruments and systems.	383	CAA monitoring, certification, staff experience
		Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations	384	Pilot training, monitoring by ATC
		Inadequate certification process and / or flaws in methodology concerning	385	Multistage process acceptance, process update

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 control process -Hydraulic system components.	386	Certification of product and manufacturer, market pressure, CAA monitoring, audits
		Flaws in aircraft system maintenance process definition - Power supply system components	387	CAA monitoring, certification, staff experience
		Poor application of T/O & RTO procedure, aircraft handling	388	Pilot training, computerised control aid, monitoring by ATC
		Lack of adherence to the SOP in terms of critical manoeuvre execution - flare	389	Pilot training, monitoring by ATC
		Extreme operation condition / poor maintenance quality / advanced life length	390	Maintenance certification, audits, CAA monitoring
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components	391	Multistage process acceptance, process update
		Flaws in aircraft system maintenance process definition - Aircraft door system and / or components	392	CAA monitoring, certification, staff experience
		Flaws in manufacturer quality control process - Aircraft door system and / or components	393	Certification of product and manufacturer, market pressure, CAA monitoring, audits
		Flaws in airport capacity management process	400	
		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401	
		Lack of adherence to SOP for take-off procedure in terms of	404	

Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.	DEFENCES/CONTROLS
		time limitation for take-off preparation.		
		Lack of adherence to engine limitations	409	Pilot training, certified computerised engine management
		Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)	410	CAA monitoring, certification, staff experience
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MSAW System	411	Multistage process acceptance, process update
		Descent above desired descent profile	412	Pilot training, instrument panel aids
		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	Pilot training and experience
		Late deceleration and configuration set-up for approach and landing	414	Pilot training, ATC cooperation
		DME / ILS DME confusion in assessing the final descent point / FAF	415	Pilot training, multiple information source
		Unstabilized final approach (high, fast, steep, ...)	416	Pilot training, ILS, instrument panel aids
		Tailwind component above limit	417	ATC guidance, weather monitoring
		Failure to remember / assess crosswind component limit for prevailing runway condition	418	ATC cooperation, pilot training
		Lack of adherence to SOP for take-off procedure in terms of speed bug checklist preparation and verification.	419	Staff training, ATC cooperation

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 - FCS system or components	420	Multistage process acceptance, process update
		Flaws in manufacturer quality control process - FCS system components	421	Certification of product and manufacturer, market pressure, CAA monitoring, audits
		Flaws in aircraft system maintenance process definition - FCS systems or components	422	CAA monitoring, certification, staff experience
		Inappropriate continuation of landing after bounce	423	Pilot training, ATC cooperation
		Inadequate bounce recovery technique	424	Pilot training
		Inadequate crosswind landing / decrab technique	425	Pilot training
		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 thrust	175	Pilot training
		Inappropriate use of differential reverse thrust	430	Pilot training, computerised control aid
		Inadequate use of differential braking	432	Pilot training, computerised control aid
		Use of nose wheel steering tiller during rollout	433	Pilot training
		Vacating runway at excessive speed for given turn-off angle and surface condition	434	Pilot training, ATC monitoring and cooperation
		Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing	246	Pilot training
		Lack of adherence to emergency procedures	448	Staff training

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 components	474	CAA monitoring, certification, staff experience
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire detection system components	475	Multistage process acceptance, process update
		Flaws in manufacturer quality control process - Fire detection system components	476	Certification of product and manufacturer, 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 Events)	No.	Deviations (Procedural/Flight Path)	No.	DEFENCES/CONTROLS
		extinguishing system components		
		Lack of adherence to AFM in terms of emergency procedures - fire detection and extinguishing procedure	483	Staff training
		Unintuitive and / or error prone system manual - fire extinguishing system	484	Certification, market pressure, regulations update, customer feedback
		Flaws in aircraft system maintenance process definition - GPWS system components	485	CAA monitoring, certification, staff experience
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - GPWS system components	486	Multistage process acceptance, process update
		Flaws in manufacturer quality control process - GPWS system components	487	Certification of product and manufacturer, market pressure, CAA monitoring, audits
		Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS)	488	CAA monitoring, certification, staff experience
		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	Multistage process acceptance, process update
		Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS)	490	Certification of product and manufacturer, market pressure, CAA monitoring, audits
		Flaws in aircraft system maintenance process definition - Onboard navigational systems	491	CAA monitoring, certification, staff experience

Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path) and components	No.	DEFENCES/CONTROLS
		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 immediate 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

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			

Basing on CATS for ASCOS v0.1.xls and ASCOS D3.2, p. 120, 121

ESDs not present in CATS for ASCOS v0.1.xls or marked as “included in ESD ASC-...” - in red

ESD	Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.
CATS	PRECURSORS			
v0.1	Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.
1	ESD1 System failure affecting the operation of primary instruments / displays or standby instruments	26	Unintuitive and / or error prone system manual - CPCS	500
2	System failure affecting aircraft configuration, controllability and/or flying qualities	25	Poor application of T/O & RTO procedure, failure recognition and preparedness	209
3	Prolonged loss of communications (PLOC) between pilot and controller(s)	53	Poor application of T/O & RTO procedure, computation of T/O parameters	260
4	Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll	98	Poor application of T/O & RTO procedure, braking initiation sequence	199
5	Landing gear retraction failure	63	Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207
6	Engine failure	77	Pilot tiredness - Inadequate workload distribution	167
7	Convective weather - heavy rain resulted with wet RWY surface	75	Navigation deviation	317
8	Contaminated Runway	39	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
9	Cabin pressure drop as a result of pneumatic system failure	79	Lack of or poor communication quality	146
10			Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216
11			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
12			Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components	230

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 components.	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 components.	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 occurrences 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 airtaxi 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 / clearance	143
122			Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airtaxi 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 maintenance - 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 maintenance - 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 maintenance - 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
428			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 maintenance - 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 maintenance - 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 maintenance - 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 effectiveness 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 detection 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 components	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 manoeuvre 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 manoeuvre 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 length	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 maintenance - 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 maintenance - 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 constraints 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 - MTC 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 omitted	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

ESD	Occurrences (Uneventful Events)	No.	Deviations (Procedural/Flight Path)	No.
2817			Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airtsite and airport topology.	142
2818			Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications	140
2819			Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	143
2820			Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airtsite or / and aircraft / vehicle proximity	144
2821			Lack of adherence to SOP for GND movements.	141
2822			Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	160
2823			Lack of adherence to ICAO Annex 14 and related documents in terms of nonrestricted view on airtsite from TWR	166
2824			Lack of adherence to ICAO Annex 14 and related documents in terms of airside lights distribution	147
2825			Lack of adherence to emergency procedures - RWY collision avoidance	135
2826			Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	139
2827			Incorrect or confusing / misleading ATC instructions	133
2828			Inadvertent deviation from cleared taxi route	131
2829			Inadequate management / separation of takeoffs and landings	153
2830			Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - RCWS	205
2831			Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground Radar	165
2832			Hearback ommitted	169
2833			Flaws in traffic controller requirements definition process and/or training methodology	145
2834			Flaws in pilot requirements definition process and/or training methodology	168
2835			Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
2836			Current airport diagram not reflecting critical changes	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 Nav aids 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 immediate answer on supporting systems warning. Navigational aid failure.	303
3018			Lack of adherence to SOP. Lack of awareness and immediate 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 clearance 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 inappropriate 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 communication.	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 airtaxi 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 / clearance	143
3113			Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airtaxi 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

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, recipient tests, audits
36		Certification, recipient tests, audits
37		Certification, market pressure, regulations update, customer feedback
38		Certification, market pressure
39		Certification of product and manufacturer, market pressure, CAA monitoring, audits
40		Certification of product and manufacturer, market pressure, CAA monitoring, audits
41		Certification of product and manufacturer, 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
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 regulations, 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 training	State labor regulations, labor unions, ATM work organisation
105	Aircraft maintenance, A, B, C, D-checks	Staff training, communication equipment requirements, maintenance
106	Weather forecast, flight plan, navigation aids, Tower guidance	Staff 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 evaluation
113		Process evaluation, multistage acceptance, voluntary reporting
114		Pilot training, aircraft tracking by ATC
115		Pilot training, tower guidance, aircraft tracking
116		Pilot training, tower guidance, aircraft tracking
117		Pilot training, tower guidance, aircraft tracking
118		Pilot training, tower guidance, aircraft tracking
119		Pilot training, tower guidance
120		Pilot training, tower guidance
121		Pilot training, system design, test, calibration
122		Pilot training, staff training and cooperation

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 qualification 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 regulations, 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, calibration
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 regulations, 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, calibration
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 manufacturer, 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 regulations, 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 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, calibration
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 regulations, 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, recipient tests
517		Aircraft design, tests and certification
518		Air carrier organisation, state labour regulations, labour unions
701	ESD8 Aircraft maintenance checks, fail-safe design	Voluntary reporting system, state authorities scrutiny
702	weather 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 product and manufacturer, recipient test, reporting systems
714		CAA monitoring, state regulations
715		Air carrier organisation, state labour regulations, 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 manufacturer, 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
912		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 manufacturer, market pressure, CAA monitoring, audits
921			Certification of product and manufacturer, 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 regulations, 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, aircraft 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 engine 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 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
1036			Aircraft certification, proper design, maintenance checks, maintenance certification
1037			Air carrier organisation, state labour regulations, 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, recipient 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, copmonent 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

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, recipient tests, audits
1223			Certification, recipient tests, audits
1224			Certification, recipient test, audits
1225			CAA monitoring, certification, staff experience
1226			Air carrier organisation, state labour regulations, 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, aircraft 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 training, tower guidance, aircraft tracking
1310		Pilot training incl. IFR flights, ATM guidance, navigation aids, pilot training	Pilot training, monitoring by ATC
1311			Pilot qualification 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 manufacturer, 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 regulations, 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 manufacturer, market pressure, CAA monitoring, audits
1412			CAA monitoring, certification, staff experience
1413			Aircraft design, tests and certification
1414			Air carrier organisation, state labour regulations, 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 regulations, 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 manufacturer, market pressure, CAA monitoring, audits
1617		CAA monitoring, certification, staff experience
1618		Air carrier organisation, state labour regulations, 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	Pilot 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, aircraft design	Pilot training, fly-by-wire
1723	Aircraft maintenance checks, aircraft 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

ESD		Occurrences (Uneventful Events)	Deviations (Procedural/Flight Path)
1744			Multistage process acceptance, process update
1745			Multistage process acceptance, process update
1746			Multistage process acceptance, process update
1747			International and state regulations, norms, audits, certification and their updates
1748			Certification, regulations update
1749			Certification, recipient tests, audits
1750			Certification of product and manufacturer, market pressure, CAA monitoring, audits
1751			Certification of product and manufacturer, market pressure, CAA monitoring, audits
1752			Certification of product and manufacturer, market pressure, CAA monitoring, audits
1753			Certification of product and manufacturer, market pressure, CAA monitoring, audits
1754			Certification of product and manufacturer, market pressure, CAA monitoring, audits
1755			CAA monitoring, EU and state regulations, voluntary reporting
1756			CAA monitoring, certification, staff experience
1757			CAA monitoring, certification, staff experience
1758			CAA monitoring, certification, staff experience
1759			CAA monitoring, certification, staff experience
1760			CAA monitoring
1761			Aircraft design, tests and certification
1762			Air carrier organisation, state labour regulations, labour unions
1801	ESD19	Work organisation, state labor regulations, unions, labor audits/inspections	Voluntary reporting system, state authorities scrutiny
1802		Weather forecast, flight plan, navigation aids, Tower guidance	State labor regulations, labor unions, ATM work organisation
1803			Staff training, certification
1804		Runway state monitoring, Airport safety program, weather forecast	Staff training, certification
1805		Pilot training, aircraft tracking by airport tower	Staff training, certification
1806		Pilot training, weather forecast, flight plan, ATM guidance, navigation aids	Staff training
1807		Pilot training, ILS, Tower guidance, glideslope	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

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 evaluation
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, aircraft 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 manufacturer, 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 regulations, 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 evaluation
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 manufacturer, 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 regulations, 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 guidance	Requirements evaluation, multistage acceptance, voluntary 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 product and manufacturer, recipient test, reporting systems
2029		Certification of product and manufacturer, market pressure, CAA monitoring, audits
2030		CAA monitoring, state regulations
2031		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 regulations, 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 manufacturer, market pressure, CAA monitoring, audits
2114			CAA monitoring, certification, staff experience
2115			ATC guidance, weather monitoring
2116			Air carrier organisation, state labour regulations, 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		Pilot training incl. IFR flights, ATM guidance, navigation aids, pilot training	Requirements evaluation, multistage acceptance, voluntary reporting
2207			Reporting system, procedure updates and evaluation
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 regulations, 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 manufacturer, market pressure, CAA monitoring, audits
2308			CAA monitoring, certification, staff experience
2309			CAA monitoring
2310			Air carrier organisation, state labour regulations, 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 goodwill 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

ESD	Occurrences (Uneventful Events)	Deviations (Procedural/Flight Path)
2710	Pilot training incl. IFR flights, ATM guidance, navigation aids, pilot training	Staff training, communication equipment requirements, maintenance
2711		Staff training and experience
2712		Staff training
2713		Staff training
2714		Staff training
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		Pilot training, aircraft tracking and ATM cooperation
2723		Pilot and ATC training
2724		Pilot training, staff training and cooperation
2725		Pilot training, notification in instrument
2726		Pilot training
2727		Pilot qualification 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, transponders 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		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

ESD		Occurrences (Uneventful Events)	Deviations (Procedural/Flight Path)
2816			Process evaluation, multistage acceptance, voluntary reporting
2817			Pilot training, tower guidance, aircraft tracking
2818			Pilot training, tower guidance, aircraft tracking
2819			Pilot training, tower guidance, aircraft tracking
2820			Pilot training, tower guidance, aircraft tracking
2821			Pilot training, 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 qualification 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 regulations, labour unions
3001	ESD35	Aircraft maintenance checks, fail-safe design	Voluntary reporting systems, CAA cooperation 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 requirements, maintenance
3007		Equipment maintenance	Staff training, audits, CAA monitoring, state norms and regulations

ESD	Occurrences (Uneventful Events)	Deviations (Procedural/Flight Path)
3008	Pilot training, ATM and tower guidance, flight plan, Navigation aids	Staff training
3009	Maintenance staff training, database design, backups, database backlogs	Staff training
3010	Pilot training incl. IFR flights, ATM guidance, navigation aids, pilot training	Staff 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 evaluation
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 awareness, communication between pilot and ATM
3025		Pilot qualification 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 guidance, 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

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, 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 level	Requirements evaluation, multistage acceptance, voluntary reporting
3109		Maintenance operation organisation, audits, staff training	Requirements evaluation, multistage acceptance, voluntary 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
3113			Pilot traning, tower guidance, aircraft tracking

ESD	Occurrences (Uneventful Events)	Deviations (Procedural/Flight Path)
3114		Pilot training, tower guidance, aircraft tracking
3115		Pilot training, tower guidance, aircraft tracking
3116		Pilot training, tower ATM training
3117		Pilot training, fly-by-wire/light
3118		Pilot qualification 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 regulations, 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)
4		Engine maintenance, checks, design, pilot training	Staff training, communication equipment requirements, 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, recipient tests, audits	
36			Certification, recipient tests, audits	
37			Certification, market pressure, regulations update, customer feedback	
38			Certification, market pressure	
39			Certification of product and manufacturer, market pressure, CAA monitoring, audits	
40			Certification of product and manufacturer, market pressure, CAA monitoring, audits	
41			Certification of product and manufacturer, 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			Aircraft design, tests and certification	
62			Air carrier organisation, state labour regulations, 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)
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 requirements, 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 evaluation	
113		Process evaluation, multistage acceptance, voluntary reporting	
114		Pilot training, aircraft tracking by ATC	
115		Pilot training, tower guidance, aircraft tracking	
116		Pilot training, tower guidance, aircraft tracking	
117		Pilot training, tower guidance, aircraft tracking	
118		Pilot training, tower guidance, aircraft tracking	
119		Pilot training, tower guidance	
120		Pilot training, tower guidance	
121		Pilot training, system design, test, calibration	
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 qualification 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 regulations, 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)
204		Runway state monitoring, Airport safety program	Staff training	Maximum Braking (V<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 regulations, 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)
304		Aircraft maintenance checks, fail-safe design	Requirements evaluation, multistage acceptance, voluntary reporting	Maximum Braking (V<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 manufacturer, 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)
405		Aircraft maintenance checks, fail-safe design	State labor regulations, labor unions, ATM work organisation	Stall avoidance (V<V1)
406		Aircraft maintenance checks, fail-safe design	Staff training, tower guidance, cockpit design	Control recovery (V<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	
440		Aircraft design, tests and certification	

No.		Prevention (Detection/Recovery) to Occurrences (Uneventful Events)	Prevention (Detection/Recovery) to Deviations (Procedural/Flight Path)	CATS barriers
441			Air carrier organisation, state labour regulations, 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, recipient tests	
517			Aircraft design, tests and certification	
518			Air carrier organisation, state labour regulations, 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 product and manufacturer, recipient test, reporting systems	
714			CAA monitoring, state regulations	
715			Air carrier organisation, state labour regulations, 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)
803		Runway state monitoring, Airport safety program	State labor regulations, labor unions, ATM work organisation	Maximum Braking (V<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	

No.		Prevention (Detection/Recovery) to Occurrences (Uneventful Events)	Prevention (Detection/Recovery) to Deviations (Procedural/Flight Path)	CATS barriers
815			Certification of product and manufacturer, 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 regulations, 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)
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 cooperation	
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, calibration	
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 manufacturer, market pressure, CAA monitoring, audits	
921			Certification of product and manufacturer, 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 regulations, 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, aircraft design, security, maintenance staff training,	Quality assurance (e.g. FMEA), reporting systems, process update	
1010			Pilot training, certified computerised engine 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 regulations, 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, recipient 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 regulations, 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, aircraft 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, component 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, recipient tests, audits	
1223			Certification, recipient tests, audits	
1224			Certification, recipient test, audits	
1225			CAA monitoring, certification, staff experience	
1226			Air carrier organisation, state labour regulations, 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 training, tower guidance, aircraft tracking	
1310		Aircraft maintenance checks, aircraft design, security, maintenance staff training,	Pilot training, monitoring by ATC	
1311			Pilot qualification 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 manufacturer, 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 regulations, 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 regulations, 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	
1507			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 regulations, 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	Steward(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, aircaft design	Pilot training, tower ATM training	
1617		Aircraft maintenance checks, aircaft 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 regulations, 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 evaluation	
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, calibration	
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, aircraft 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 regulations, 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 evaluation	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 manufacturer, market pressure, CAA monitoring, audits	
1832		CAA monitoring, EU and state regulations, voluntary reporting	
1833		CAA monitoring, certification, staff experience	

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 regulations, 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 product and manufacturer, recipient test, reporting systems	
2029			Certification of product and manufacturer, 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 regulations, 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 manufacturer, 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 regulations, 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 evaluation	
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 regulations, 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 manufacturer, market pressure, CAA monitoring, audits	
2308			CAA monitoring, certification, staff experience	
2309			CAA monitoring	
2310			Air carrier organisation, state labour regulations, 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 goodwill 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			Pilot training, aircraft tracking and ATM cooperation	
2723			Pilot and ATC training	
2724			Pilot training, staff training and cooperation	
2725			Pilot training, notification in instrument	
2726			Pilot training	
2727			Pilot qualification 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, transponers installed in GA aircraft	
2752			Aircraft tracking by ATM, transponers, navigation aids, pilot training	
2753			Air staff and ATM staff training	
2754			Air carrier organisation, state labour regulations, 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 requirements, 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 training, tower guidance, aircraft tracking	
2818		Pilot training, tower guidance, aircraft tracking	
2819		Pilot training, tower guidance, aircraft tracking	
2820		Pilot training, tower guidance, aircraft tracking	
2821		Pilot training, 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 qualification 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 regulations, labour unions	
3001	ESD35	Runway state monitoring	Voluntary reporting systems, CAA cooperation 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 requirements, 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 evaluation	
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 awareness, communication between pilot and ATM	
3025		Pilot qualification 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 guidance, 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 traning	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 traning	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 training, tower guidance, aircraft tracking	
3111			Pilot training, tower guidance, aircraft tracking	
3112			Pilot training, tower guidance, aircraft tracking	
3113			Pilot training, tower guidance, aircraft tracking	
3114			Pilot training, tower guidance, aircraft tracking	
3115			Pilot training, tower guidance, aircraft tracking	
3116			Pilot training, tower ATM training	
3117			Pilot training, fly-by-wire/light	
3118			Pilot qualification 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 regulations, 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:

- 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)

Base events		Code	Definition	Identifiable precursors	No.
ESD 35	Base events	Code	Definition	Identifiable precursors	No.
	1			Flight crew decision error /operation of equipment error	
1	1	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
	2			Inadequate NOTAM information concerning ground navigational aid failure	68
	3			Traffic controller tiredness - Inadequate workload distribution	137
	4			Flaws in traffic controller requirements definition process and/or training methodology	145
	5			Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
	6			Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
	7			Not recognized ground Navaids System failure not reflected in NOTAM messages	308
	8			Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS)	488
	9			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
	10			Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS)	490
1	2	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
	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			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	224
	8			Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. Navigational aid failure.	303
	9			Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491
	10			Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492
	11			Flaws in manufacturer quality control process - Onboard navigational systems and components.	493
1	3	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
	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 in terms of approach and landing	245
	4	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 flight towards terrain.	Flaws in aircraft system maintenance process definition - sticksaker	136
				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 clearance instruction	307
1	5	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
	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 in terms of approach and landing	245
1	6	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
	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			Pilot tiredness - Inadequate workload distribution	167
	4			Flaws in pilot requirements definition process and/or training methodology	168
	5			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
	6			Altimeter setting error	274
1	7	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.	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	245
1	8	AL35F53	Given an ITC is executed by pilot, the trajectory is in conflict with terrain	Adverse weather / poor visibility conditions / darkness	6
	2			GPWS / TAWS alert / warning (genuine or spurious)	50
	3			MSAW warning	51

	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	
3				Traffic controller tiredness - Inadequate workload distribution	137	
4				Flaws in traffic controller requirements definition process and/or training methodology	145	
5				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149	
6				Maintenance technician / airworthiness specialist tiredness - Inadequate workload 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	275	
11				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299	
12				Not recognized ground Navaids System failure not reflected in NOTAM messages	308	
13				Flaws in aircraft system maintenance process definition - Ground navigational systems 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)	489	
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 process and/or training methodology	149	
3				Maintenance technician / airworthiness specialist tiredness - Inadequate workload 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	224	
8				Failure to check navigation accuracy before approach	275	
9				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299	
10				Lack of adherence to SOP. Lack of awareness and immediate answer on supporting 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 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)	489	
1	12	FMS nav database error causes ITC	AL35F6214	Given an FMS trajectory command during approach, an ITC is executed due to FMS database error.	Error in preparation of database for FMS	61
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	
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				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 (autopilot incl.)	306	
6				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	
3				Flaws in pilot requirements definition process and/or training methodology	168	
4				Incorrect use of automation - FMS	269	
5				Unintuitive and / or error prone system manual - FMS	494	
1	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 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				Lack of adherence to SOP in terms of approach and landing	245	
4				Incorrect use of automation - FMS	269	
1	16	Incorrect trajectory conflicts with terrain	AL35F63	Given an ITC is executed by FMS, the trajectory is in conflict with terrain	Adverse weather / poor visibility conditions / darkness	6
2				GPWS / TAWS alert / warning (genuine or spurious)	50	
3				MSAW warning	51	
1	17	Inadequate trajectory command (ITC) by ATCO	AL35F721	Given an ATC trajectory command during approach, an ITC is 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 methodology	145	
3				Current airport diagram not reflecting critical changes	155	
1	18	Inadequate communication with pilot	AL35F722	Given an ATC trajectory command during approach, an ITC is 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				Use of non-standard phraseology by pilot and/or controller	134	
5				Traffic controller tiredness - Inadequate workload distribution	137	
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 driver	148	
9				Pilot tiredness - Inadequate workload distribution	167	
10				Flaws in pilot requirements definition process and/or training methodology	168	
1	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 readback.	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 in terms of approach and landing	245	
1	20	Incorrect trajectory conflicts with terrain	AL35F73	Given an ITC is executed by ATC, the trajectory is in conflict with terrain	Adverse weather / poor visibility conditions / darkness	6
2				GPWS / TAWS alert / warning (genuine or spurious)	50	
3				MSAW warning	51	
II + I	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 flying (PNF) fails to detect it due to lack of fitness (e.g. fatigue).	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				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 instruments	26	
8				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				Ground Navigational Aid failure	62	
13				Inadequate NOTAM information concerning ground navigational aid failure	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 protecting of critical aircraft systems against contamination	233	
17				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 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 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				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	
29				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	
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	
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	
36				Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. Navigational aid failure.	303	
37				Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)	306	
38				Lack of adherence to SOP for AIR operations in terms of controller error in approach clearance instruction	307	
39				Not recognized ground NavAids System failure not reflected in NOTAM messages	308	

Base events	Code	Definition	Identifiable precursors	No.	
			Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)	410	
			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 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 components (e.g. ILS)	490	
			Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491	
			Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492	
			Flaws in manufacturer quality control process - Onboard navigational systems and components.	493	
			Unintuitive and / or error prone system manual - FMS	494	
1	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).	151
2				Pilot tiredness - Inadequate workload distribution	167
3				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 instruments	26
8				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				Ground Navigational Aid failure	62
13				Inadequate NOTAM information concerning ground navigational aid failure	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 protecting of critical aircraft systems against contamination	233
17				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 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 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				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
29				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
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
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
36				Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. Navigational aid failure.	303
37				Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)	306
38				Lack of adherence to SOP for AIR operations in terms of controller error in approach clearance 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 components (autopilot incl.)	410
41				Flaws in aircraft system maintenance process definition - Ground navigational systems 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 and components (e.g. ILS)	489
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 systems and components	491
45				Inadequate certification process and / or flaws in methodology concerning verification 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	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).	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 in terms of approach and landing	245

Base events	Code	Definition	Identifiable precursors	No.		
			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 instruments	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	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 protecting of critical aircraft systems against contamination	233		
			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		
			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		
			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).	225		
			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 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299		
			Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. Navigational aid failure.	303		
			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 clearance instruction	307		
			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.)	410		
			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 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 components (e.g. ILS)	490		
			Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491		
			Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492		
			Flaws in manufacturer quality control process - Onboard navigational systems and components.	493		
			Unintuitive and / or error prone system manual - FMS	494		
1	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.	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 in terms of approach and landing	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					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					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	132
17					Lack of adherence to SOP during aircraft storage and / or maintenance in terms of 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 methodology	145
21					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 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 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 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	275	
36				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299	
37				Lack of adherence to SOP. Lack of awareness and immediate 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 clearance 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 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)	489	
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 systems and components	491	
46				Inadequate certification process and / or flaws in methodology concerning verification 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 performing independent monitoring.	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 in terms of approach and landing	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				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				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	132	
17				Lack of adherence to SOP during aircraft storage and / or maintenance in terms of 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 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 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				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 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	275	

	Base events	Code	Definition	Identifiable precursors	No.
36				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299
37				Lack of adherence to SOP. Lack of awareness and immediate 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 clearance 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 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)	489
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 systems and components	491
46				Inadequate certification process and / or flaws in methodology concerning verification 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	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.	151
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				Pilot tiredness - Inadequate workload distribution	167
4				Flaws in pilot requirements definition process and/or training methodology	168
5				Lack of adherence to SOP in terms of approach and landing	245
6				Flaws in CRM training procedures	263
7				Lack of adherence to the main CRM rules	264
8				Adverse weather / poor visibility conditions / darkness	6
9				System failure affecting the operation of primary instruments / displays or standby instruments	26
10				GPWS / TAWS alert / warning (genuine or spurious)	50
11				MSAW warning	51
12				Prolonged loss of communications (PLOC) between pilot and controller(s)	53
13				Error in preparation of database for FMS	61
14				Ground Navigational Aid failure	62
15				Inadequate NOTAM information concerning ground navigational aid failure	68
16				Inadequate navigational chart	69
17				Lack of English proficiency	132
18				Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination	233
19				Use of non-standard phraseology by pilot and/or controller	134
20				Traffic controller tiredness - Inadequate workload distribution	137
21				Flaws in traffic controller requirements definition process and/or training methodology	145
22				Lack of or poor communication quality	146
23				Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	148
24				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
25				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
26				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 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	224
31				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
32				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 components (autopilot incl.)	299
37				Lack of adherence to SOP. Lack of awareness and immediate 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 clearance 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 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)	489
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 systems and components	491

	Base events	Code	Definition	Identifiable precursors	No.
46				Inadequate certification process and / or flaws in methodology concerning verification 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	27	Inexperienced PNF not monitoring PF	AL35B4124	Given an FTTC, PNF fails to detect it due to being inexperienced and not performing independent monitoring of the more experienced PF.	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 in terms of approach and landing	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				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				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	132
17				Lack of adherence to SOP during aircraft storage and / or maintenance in terms of 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 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 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				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 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	275
36				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299
37				Lack of adherence to SOP. Lack of awareness and immediate 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 clearance 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 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)	489
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 systems and components	491
46				Inadequate certification process and / or flaws in methodology concerning verification 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	28	Failure of on-board monitoring	AL35B42	Given an FTTC, PNF performs independent monitoring, but fails to recognise the trajectory command is incorrect.	167
2				Flaws in pilot requirements definition process and/or training methodology	168
3				Adverse weather / poor visibility conditions / darkness	6
4				System failure affecting the operation of primary instruments / displays or standby instruments	26
5				GPWS / TAWS alert / warning (genuine or spurious)	50
6				MSAW warning	51
7				Prolonged loss of communications (PLOC) between pilot and controller(s)	53
8				Error in preparation of database for FMS	61
9				Ground Navigational Aid failure	62
10				Inadequate NOTAM information concerning ground navigational aid failure	68
11				Inadequate navigational chart	69
12				Lack of English proficiency	132

Base events	Code	Definition	Identifiable precursors	No.		
			Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination	233		
			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		
			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		
			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).	225		
			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 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299		
			Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. Navigational aid failure.	303		
			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 clearance instruction	307		
			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.)	410		
			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 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 components (e.g. ILS)	490		
			Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491		
			Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492		
			Flaws in manufacturer quality control process - Onboard navigational systems and components.	493		
			Unintuitive and / or error prone system manual - FMS	494		
1	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 concerns to the PF.	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	245
4					Flaws in CRM training procedures	263
5					Lack of adherence to the main CRM rules	264
6					Imbalanced and inappropriate relation between cpt and his subordinates	304
7					Adverse weather / poor visibility conditions / darkness	6
8					System failure affecting the operation of primary instruments / displays or standby 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					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	132
17					Lack of adherence to SOP during aircraft storage and / or maintenance in terms of 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 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 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					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

Base events		Code	Definition	Identifiable precursors	No.
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 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	275
36				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299
37				Lack of adherence to SOP. Lack of awareness and immediate 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 clearance 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 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)	489
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 systems and components	491
46				Inadequate certification process and / or flaws in methodology concerning verification 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	30	PNF superior and silent	AL35B432	Given an FTTC, the PNF recognises the error, but fails to communicate this in order to test or train the PF.	
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 in terms of approach and landing	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				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				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	132
17				Lack of adherence to SOP during aircraft storage and / or maintenance in terms of 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 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 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				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 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
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 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299
36				Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. Navigational aid failure.	303
37				Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)	306
38				Lack of adherence to SOP for AIR operations in terms of controller error in approach clearance 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 components (autopilot incl.)	410
41				Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS)	488

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)	489
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 systems and components	491
45				Inadequate certification process and / or flaws in methodology concerning verification 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	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	245
4				Flaws in CRM training procedures	263
5				Lack of adherence to the main CRM rules	264
6				Imbalanced and inappropriate relation between cpt and his subordinates	304
7				Adverse weather / poor visibility conditions / darkness	6
8				System failure affecting the operation of primary instruments / displays or standby 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				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	132
17				Lack of adherence to SOP during aircraft storage and / or maintenance in terms of 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 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 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				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 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	275
36				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299
37				Lack of adherence to SOP. Lack of awareness and immediate 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 clearance 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 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)	489
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 systems and components	491
46				Inadequate certification process and / or flaws in methodology concerning verification 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	32	AL35B442	Given an FTTC, flight crew express concerns about the trajectory command but the controller confirms it and the flight crew execute 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	245
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

	Base events	Code	Definition	Identifiable precursors	No.
7				System failure affecting the operation of primary instruments / displays or standby instruments	26
8				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				Ground Navigational Aid failure	62
13				Inadequate NOTAM information concerning ground navigational aid failure	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 protecting of critical aircraft systems against contamination	233
17				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 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 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				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
29				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
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
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
36				Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. Navigational aid failure.	303
37				Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)	306
38				Lack of adherence to SOP for AIR operations in terms of controller error in approach clearance 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 components (autopilot incl.)	410
41				Flaws in aircraft system maintenance process definition - Ground navigational systems 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 and components (e.g. ILS)	489
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 systems and components	491
45				Inadequate certification process and / or flaws in methodology concerning verification 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
III + II + I	III	Flight crew loss of situation awareness		Flight crew loss of situation awareness	
1	33	Imminent CFIT above decision height (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 instruments	26
4				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				Error in preparation of database for FMS	61
8				Ground Navigational Aid failure	62
9				Inadequate NOTAM information concerning ground navigational aid failure	68
10				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 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	137
15				Flaws in traffic controller requirements definition process and/or training 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 process and/or training methodology	149
19				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150

	Base events	Code	Definition	Identifiable precursors	No.
20				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
21				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 RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).	225
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
31				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				Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. Navigational aid failure.	303
33				Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)	306
34				Lack of adherence to SOP for AIR operations in terms of controller error in approach clearance 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
37				Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS)	488
38				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
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 systems and components	491
41				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492
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 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				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 inappropriate relation between cpt and his subordinates	304
1	34	Low visibility over terrain	AL35B2111	Given an imminent CFIT above decision height (DH), the terrain ahead is in effect invisible due to cloud, fog etc	
2				Adverse weather / poor visibility conditions / darkness	6
3				System failure affecting the operation of primary instruments / displays or standby instruments	26
4				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				Error in preparation of database for FMS	61
8				Ground Navigational Aid failure	62
9				Inadequate NOTAM information concerning ground navigational aid failure	68
10				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 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	137
15				Flaws in traffic controller requirements definition process and/or training 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 process and/or training methodology	149
19				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
20				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
21				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 RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).	225
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
31				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				Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. Navigational aid failure.	303

	Base events	Code	Definition	Identifiable precursors	No.
33				Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)	306
34				Lack of adherence to SOP for AIR operations in terms of controller error in approach clearance 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
37				Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS)	488
38				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
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 systems and components	491
41				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492
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 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				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 inappropriate relation between cpt and his subordinates	304
1	35	Dark terrain	AL35B2112	Given an imminent CFIT above DH, the terrain ahead is in effect invisible due to darkness combined with lack of illumination on the terrain.	
2				Adverse weather / poor visibility conditions / darkness	6
3				System failure affecting the operation of primary instruments / displays or standby instruments	26
4				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				Error in preparation of database for FMS	61
8				Ground Navigational Aid failure	62
9				Inadequate NOTAM information concerning ground navigational aid failure	68
10				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 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	137
15				Flaws in traffic controller requirements definition process and/or training 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 process and/or training methodology	149
19				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
20				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
21				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 RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).	225
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
31				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				Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. Navigational aid failure.	303
33				Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)	306
34				Lack of adherence to SOP for AIR operations in terms of controller error in approach clearance 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
37				Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS)	488
38				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
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 systems and components	491

	Base events	Code	Definition	Identifiable precursors	No.
41				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492
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 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				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 inappropriate relation between cpt and his subordinates	304
1	36	AL35B212	Given an imminent CFIT above DH with visible terrain ahead, flight crew fail to see the terrain in time to avoid an imminent CFIT.	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 in terms of approach and landing	245
5				Adverse weather / poor visibility conditions / darkness	6
6				System failure affecting the operation of primary instruments / displays or standby 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				Inadequate NOTAM information concerning ground navigational aid failure	68
13				Inadequate navigational chart	69
14				Lack of English proficiency	132
15				Lack of adherence to SOP during aircraft storage and / or maintenance in terms of 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 methodology	145
19				Lack of or poor communication quality	146
20				Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	148
21				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
22				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
23				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
24				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
28				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
29				Lack of adherence to SOP in terms of approach and landing	245
31				Incorrect use of automation - FMS	269
32				Altimeter setting error	274
33				Failure to check navigation accuracy before approach	275
34				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299
35				Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. Navigational aid failure.	303
36				Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)	306
37				Lack of adherence to SOP for AIR operations in terms of controller error in approach clearance 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 components (autopilot incl.)	410
40				Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS)	488
41				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
42				Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS)	490
43				Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491
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 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 or / and passive contribution to the PF duties	151
48				Pilot tiredness - Inadequate workload distribution	167
49				Flaws in pilot requirements definition process and/or training methodology	168
50				Lack of adherence to SOP in terms of approach and landing	245
51				Flaws in CRM training procedures	263
52				Lack of adherence to the main CRM rules	264
53				Imbalanced and inappropriate relation between cpt and his subordinates	304

	Base events	Code	Definition	Identifiable precursors	No.
1	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.	60
2				Natural or artificial obstacle on runway course	167
3				Pilot tiredness - Inadequate workload distribution	168
4				Flaws in pilot requirements definition process and/or training methodology	295
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.	6
6				Adverse weather / poor visibility conditions / darkness	26
7				System failure affecting the operation of primary instruments / displays or standby instruments	50
8				GPWS / TAWS alert / warning (genuine or spurious)	51
9				MSAW warning	53
10				Prolonged loss of communications (PLOC) between pilot and controller(s)	61
11				Error in preparation of database for FMS	62
12				Ground Navigational Aid failure	68
13				Inadequate NOTAM information concerning ground navigational aid failure	69
14				Inadequate navigational chart	132
15				Lack of English proficiency	233
16				Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination	134
17				Use of non-standard phraseology by pilot and/or controller	137
18				Traffic controller tiredness - Inadequate workload distribution	145
19				Flaws in traffic controller requirements definition process and/or training methodology	146
20				Lack of or poor communication quality	148
21				Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	149
22				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	150
23				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	151
24				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	155
25				Current airport diagram not reflecting critical changes	167
26				Pilot tiredness - Inadequate workload distribution	168
27				Flaws in pilot requirements definition process and/or training methodology	224
28				Lack of adherence to the SOP in terms of critical indicators cross-checking	225
29				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
31				Lack of adherence to SOP in terms of approach and landing	269
32				Incorrect use of automation - FMS	274
33				Altimeter setting error	275
34				Failure to check navigation accuracy before approach	299
35				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	303
36				Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. Navigational aid failure.	306
37				Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)	307
38				Lack of adherence to SOP for AIR operations in terms of controller error in approach clearance instruction	308
39				Not recognized ground NavAids System failure not reflected in NOTAM messages	410
40				Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)	488
41				Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS)	489
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)	490
43				Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS)	491
44				Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	492
45				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	493
46				Flaws in manufacturer quality control process - Onboard navigational systems and components.	494
47				Unintuitive and / or error prone system manual - FMS	151
48				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	167
49				Pilot tiredness - Inadequate workload distribution	168
50				Flaws in pilot requirements definition process and/or training methodology	245
51				Lack of adherence to SOP in terms of approach and landing	263
52				Flaws in CRM training procedures	264
53				Lack of adherence to the main CRM rules	304
1	38	Imminent CFIT at decision height	AL35C3	An imminent CFIT occurs when aircraft is at decision height	60
2				Natural or artificial obstacle on runway course	167
3				Pilot tiredness - Inadequate workload distribution	168
4				Flaws in pilot requirements definition process and/or training methodology	245
5				Lack of adherence to SOP in terms of approach and landing	281
6				Premature descent to DA(H) before G/S intercept or premature descent to MDA(H) before final-descent-point / FAF	6
7				Adverse weather / poor visibility conditions / darkness	26
8				System failure affecting the operation of primary instruments / displays or standby instruments	50
9				GPWS / TAWS alert / warning (genuine or spurious)	51
10				MSAW warning	53
11				Prolonged loss of communications (PLOC) between pilot and controller(s)	61
12				Error in preparation of database for FMS	62
				Ground Navigational Aid failure	

Base events	Code	Definition	Identifiable precursors	No.		
13			Inadequate NOTAM information concerning ground navigational aid failure	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 protecting of critical aircraft systems against contamination	233		
17			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 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 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			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		
29			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		
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		
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		
36			Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. Navigational aid failure.	303		
37			Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)	306		
38			Lack of adherence to SOP for AIR operations in terms of controller error in approach clearance 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 components (autopilot incl.)	410		
41			Flaws in aircraft system maintenance process definition - Ground navigational systems 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 and components (e.g. ILS)	489		
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 systems and components	491		
45			Inadequate certification process and / or flaws in methodology concerning verification 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		
48			Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 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			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 inappropriate relation between cpt and his subordinates	304		
1	39	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					Pilot tiredness - Inadequate workload distribution	167
3					Flaws in pilot requirements definition process and/or training methodology	168
4					Premature descent below MDA(H) before reaching the visual-descent-point (VDP)	282
5					Flight below desired flight path during initial and/or final approach	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	6
9					System failure affecting the operation of primary instruments / displays or standby instruments	26
10					GPWS / TAWS alert / warning (genuine or spurious)	50
11					MSAW warning	51
12					Prolonged loss of communications (PLOC) between pilot and controller(s)	53
13					Error in preparation of database for FMS	61
14					Ground Navigational Aid failure	62
15					Inadequate NOTAM information concerning ground navigational aid failure	68
16					Inadequate navigational chart	69
17					Lack of English proficiency	132
18					Lack of adherence to SOP during aircraft storage and / or maintenance in terms of protecting of critical aircraft systems against contamination	233
19					Use of non-standard phraseology by pilot and/or controller	134
20					Traffic controller tiredness - Inadequate workload distribution	137
21					Flaws in traffic controller requirements definition process and/or training methodology	145
22					Lack of or poor communication quality	146
23					Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	148

	Base events	Code	Definition	Identifiable precursors	No.
24				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
25				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
26				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 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	224
31				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
32				Lack of adherence to SOP in terms of approach and landing	245
34				Incorrect use of automation - FMS	269
35				Altimeter setting error	274
36				Failure to check navigation accuracy before approach	275
37				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299
38				Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. Navigational aid failure.	303
39				Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)	306
40				Lack of adherence to SOP for AIR operations in terms of controller error in approach clearance instruction	307
41				Not recognized ground NavAids System failure not reflected in NOTAM messages	308
42				Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)	410
43				Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS)	488
44				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
45				Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS)	490
46				Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491
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 components.	493
49				Unintuitive and / or error prone system manual - FMS	494
50				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
51				Pilot tiredness - Inadequate workload distribution	167
52				Flaws in pilot requirements definition process and/or training methodology	168
53				Lack of adherence to SOP in terms of approach and landing	245
54				Flaws in CRM training procedures	263
55				Lack of adherence to the main CRM rules	264
56				Imbalanced and inappropriate relation between cpt and his subordinates	304
1	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).	
2				Natural or artificial obstacle on runway course	60
3				Traffic controller tiredness - Inadequate workload distribution	137
4				Flaws in traffic controller requirements definition process and/or training methodology	145
5				Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain)	278
6				Continued approach, when below DA(H) or MDA(H), after loss of visual references	284
7				Adverse weather / poor visibility conditions / darkness	6
8				System failure affecting the operation of primary instruments / displays or standby 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				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	132
17				Lack of adherence to SOP during aircraft storage and / or maintenance in terms of 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 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 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				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

Base events	Code	Definition	Identifiable precursors	No.	
			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	
			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 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299	
			Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. Navigational aid failure.	303	
			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 clearance instruction	307	
			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.)	410	
			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 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 components (e.g. ILS)	490	
			Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491	
			Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492	
			Flaws in manufacturer quality control process - Onboard navigational systems and components.	493	
			Unintuitive and / or error prone system manual - FMS	494	
			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 approach and landing	245	
			Flaws in CRM training procedures	263	
			Lack of adherence to the main CRM rules	264	
			Imbalanced and inappropriate 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 able to prevent an imminent CFIT.	
			Traffic controller tiredness - Inadequate workload distribution	137	
			Flaws in traffic controller requirements definition process and/or training methodology	145	
			Adverse weather / poor visibility conditions / darkness	6	
			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	
			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 protecting of critical aircraft systems against contamination	233	
			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	
			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	
			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).	225	
			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 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299	
			Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. Navigational aid failure.	303	
			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 clearance instruction	307	

Base events	Code	Definition	Identifiable precursors	No.		
			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.)	410		
			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 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 components (e.g. ILS)	490		
			Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491		
			Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492		
			Flaws in manufacturer quality control process - Onboard navigational systems and components.	493		
			Unintuitive and / or error prone system manual - FMS	494		
			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 approach and landing	245		
			Flaws in CRM training procedures	263		
			Lack of adherence to the main CRM rules	264		
			Imbalanced and inappropriate relation between cpt and his subordinates	304		
1	42	No MSAW available	AL35B3221	Given a CFTT with TAR available, minimum safe altitude warning (MSAW) is not available.	Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of MSAW system.	302
2					Adverse weather / poor visibility conditions / darkness	6
3					System failure affecting the operation of primary instruments / displays or standby instruments	26
4					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					Error in preparation of database for FMS	61
8					Ground Navigational Aid failure	62
9					Inadequate NOTAM information concerning ground navigational aid failure	68
10					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 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	137
15					Flaws in traffic controller requirements definition process and/or training 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 process and/or training methodology	149
19					Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
20					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
21					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 RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).	225
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
31					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					Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. Navigational aid failure.	303
33					Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)	306
34					Lack of adherence to SOP for AIR operations in terms of controller error in approach clearance 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
37					Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS)	488
38					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
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 systems and components	491
41					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492
42					Flaws in manufacturer quality control process - Onboard navigational systems and components.	493
43					Unintuitive and / or error prone system manual - FMS	494

	Base events	Code	Definition	Identifiable precursors	No.
44				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 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				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 inappropriate 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 warning in time to be able to prevent an imminent CFIT.	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MSAW System	411
2				Adverse weather / poor visibility conditions / darkness	6
3				System failure affecting the operation of primary instruments / displays or standby instruments	26
4				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				Error in preparation of database for FMS	61
8				Ground Navigational Aid failure	62
9				Inadequate NOTAM information concerning ground navigational aid failure	68
10				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 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	137
15				Flaws in traffic controller requirements definition process and/or training 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 process and/or training methodology	149
19				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
20				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
21				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 RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).	225
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
31				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				Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. Navigational aid failure.	303
33				Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)	306
34				Lack of adherence to SOP for AIR operations in terms of controller error in approach clearance 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
37				Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS)	488
38				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
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 systems and components	491
41				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492
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 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				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 inappropriate relation between cpt and his subordinates	304
1	44 ATCO failure to respond to MSAW warning	AL35B3223	Given a CFTT with MSAW warning, ATCO does not respond in time to be able to prevent an imminent CFIT.	MSAW warning	51
2				Traffic controller tiredness - Inadequate workload distribution	137
3				Flaws in traffic controller requirements definition process and/or training methodology	145
4				Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. MSAW warning.	495
5				Adverse weather / poor visibility conditions / darkness	6
6				System failure affecting the operation of primary instruments / displays or standby instruments	26

Base events	Code	Definition	Identifiable precursors	No.		
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			Inadequate NOTAM information concerning ground navigational aid failure	68		
13			Inadequate navigational chart	69		
14			Lack of English proficiency	132		
15			Lack of adherence to SOP during aircraft storage and / or maintenance in terms of 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 methodology	145		
19			Lack of or poor communication quality	146		
20			Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	148		
21			Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149		
22			Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150		
23			Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151		
24			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		
28			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		
29			Lack of adherence to SOP in terms of approach and landing	245		
31			Incorrect use of automation - FMS	269		
32			Altimeter setting error	274		
33			Failure to check navigation accuracy before approach	275		
34			Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299		
35			Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. Navigational aid failure.	303		
36			Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)	306		
37			Lack of adherence to SOP for AIR operations in terms of controller error in approach clearance 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 components (autopilot incl.)	410		
40			Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS)	488		
41			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		
42			Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS)	490		
43			Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491		
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 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 or / and passive contribution to the PF duties	151		
48			Pilot tiredness - Inadequate workload distribution	167		
49			Flaws in pilot requirements definition process and/or training methodology	168		
50			Lack of adherence to SOP in terms of approach and landing	245		
51			Flaws in CRM training procedures	263		
52			Lack of adherence to the main CRM rules	264		
53			Imbalanced and inappropriate relation between cpt and his subordinates	304		
1	45	ATCO failure to resolve conflict in time	AL35B33	Given a CFTT with ATCO alerted by an MSAW warning, ATCO and flight crew do not correct trajectory in time to prevent an imminent CFIT.	Traffic controller tiredness - Inadequate workload distribution	137
2					Flaws in traffic controller requirements definition process and/or training methodology	145
3					Pilot tiredness - Inadequate workload distribution	167
4					Flaws in pilot requirements definition process and/or training methodology	168
5					Late or inadequate response to MSAW warning	286
6					Adverse weather / poor visibility conditions / darkness	6
7					System failure affecting the operation of primary instruments / displays or standby instruments	26
8					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					Ground Navigational Aid failure	62
13					Inadequate NOTAM information concerning ground navigational aid failure	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 protecting of critical aircraft systems against contamination	233
17					Use of non-standard phraseology by pilot and/or controller	134
18					Traffic controller tiredness - Inadequate workload distribution	137

	Base events	Code	Definition	Identifiable precursors	No.
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 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 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				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
29				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
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
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
36				Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. Navigational aid failure.	303
37				Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)	306
38				Lack of adherence to SOP for AIR operations in terms of controller error in approach clearance 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 components (autopilot incl.)	410
41				Flaws in aircraft system maintenance process definition - Ground navigational systems 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 and components (e.g. ILS)	489
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 systems and components	491
45				Inadequate certification process and / or flaws in methodology concerning verification 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
48				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 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				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 inappropriate relation between cpt and his subordinates	304
IV +III +II +I	IV	GPWS failure		GPWS failure	
1	46	GPWS not installed	AL35B11	Given an imminent CFIT, the aircraft is not fitted with GPWS.	293
2				Adverse weather / poor visibility conditions / darkness	6
3				System failure affecting the operation of primary instruments / displays or standby instruments	26
4				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				Error in preparation of database for FMS	61
8				Ground Navigational Aid failure	62
9				Inadequate NOTAM information concerning ground navigational aid failure	68
10				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 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	137
15				Flaws in traffic controller requirements definition process and/or training 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 process and/or training methodology	149
19				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
20				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
21				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

	Base events	Code	Definition	Identifiable precursors	No.
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 RWY parameters and location, attitude, approach path parameters and obstacles locations (e.g. mountains).	225
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
31				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				Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. Navigational aid failure.	303
33				Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)	306
34				Lack of adherence to SOP for AIR operations in terms of controller error in approach clearance 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
37				Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS)	488
38				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
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 systems and components	491
41				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492
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 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				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 inappropriate 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 methodology	145
56				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
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 terrain)	278
61				Premature descent to DA(H) before G/S intercept or premature descent to MDA(H) before final-descent-point / FAF	281
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 RWY parameters and location, approach path parameters and obstacles locations.	295
69				Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of MSAW system.	302
70				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MSAW System	411
71				Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. MSAW warning.	495
1	47	No GPWS warning in time	AL35B12	Given an imminent CFIT on an aircraft fitted with GPWS, the GPWS does not give an appropriate warning in time for avoidance action.	149
2				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
3				Flaws in aircraft system maintenance process definition - GPWS system components	485
4				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - GPWS system components	486
5				Flaws in manufacturer quality control process - GPWS system components	487
6				Adverse weather / poor visibility conditions / darkness	6
7				System failure affecting the operation of primary instruments / displays or standby instruments	26
8				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				Ground Navigational Aid failure	62
13				Inadequate NOTAM information concerning ground navigational aid failure	68
14				Inadequate navigational chart	69

Base events	Code	Definition	Identifiable precursors	No.
			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	233
			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
			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
			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).	225
			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 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299
			Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. Navigational aid failure.	303
			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 clearance instruction	307
			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.)	410
			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 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 components (e.g. ILS)	490
			Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491
			Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492
			Flaws in manufacturer quality control process - Onboard navigational systems and components.	493
			Unintuitive and / or error prone system manual - FMS	494
			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 approach and landing	245
			Flaws in CRM training procedures	263
			Lack of adherence to the main CRM rules	264
			Imbalanced and inappropriate relation between cpt and his subordinates	304
			Adverse weather / poor visibility conditions / darkness	6
			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	145
			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 approach and landing	245
			Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain)	278
			Premature descent to DA(H) before G/S intercept or premature descent to MDA(H) before final-descent-point / FAF	281
			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.	295
			Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of MSAW system.	302
			Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MSAW System	411
			Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. MSAW warning.	495

Base event		Code	Definition	Identifiable Precursors	No.
ESD 32	Base event	Code	Definition	Identifiable Precursors	No.
	Incorrect presence of aircraft/vehicle 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				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	137
5				Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	139
6				Flaws in traffic controller requirements definition process and/or training methodology	145
7				Callsign confusion	154
8				Current airport diagram not reflecting critical changes	155
9				Takeoff without clearance	157
10				Landing without clearance	158
1	2 Inadequate communication with pilot	TO32B612	ATCO fails to communicate take-off instructions to pilot, resulting in 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	134
4				Traffic controller tiredness - Inadequate workload distribution	137
5				Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	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 driver	148
1	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	Runway confusion	1
2				Lack of English proficiency	132
3				Incorrect or confusing / misleading ATC instructions	133
4				Use of non-standard phraseology by pilot and/or controller	134
5				Traffic controller tiredness - Inadequate workload distribution	137
6				Flaws in traffic controller requirements definition process and/or training methodology	145
7				Lack of or poor communication quality	146
8				Hearback omitted	169
1	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	Taxiway confusion	7
2				Lack of English proficiency	132
3				Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications	140
4				Lack of adherence to SOP for GND movements.	141
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				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
9				Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130
1	5 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				Pilot tiredness - Inadequate workload distribution	167
3				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
4				Lack of adherence to SOP for GND movements.	141
5				Flaws in pilot requirements definition process and/or training methodology	168
6				Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129
7				Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130
1	6 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	Runway confusion	1
2				Traffic controller tiredness - Inadequate workload distribution	137
3				Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	139
4				Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airtaxi or / and aircraft / vehicle proximity	144
5				Flaws in traffic controller requirements definition process and/or training methodology	145
6				Callsign confusion	154
7				Current airport diagram not reflecting critical changes	155
8				Takeoff without clearance	157
9				Landing without clearance	158
1	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	Adverse weather / poor visibility conditions / darkness	6
2				Traffic controller tiredness - Inadequate workload distribution	137
3				Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	143
4				Flaws in traffic controller requirements definition process and/or training methodology	145
5				Inadequate management / separation of takeoffs and landings	153
1	8 Ground radar not present	TO32B41111	Ground radar is not installed at the airport or radar is not used by ATCO	Traffic controller tiredness - Inadequate workload distribution	137
2				Flaws in traffic controller requirements definition process and/or training methodology	145
3				Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ground radar at the airport.	170

	Base event	Code	Definition	Identifiable Precursors	No.
4				Lack of adherence to SOP in terms of awareness on supporting systems (warning) - ground radar.	171
1	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 distribution	150
3				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground Radar	165
1	Ineffective ATCO use of ground radar	TO32B411113	ATCO makes inappropriate use of ground radar, resulting in inadequate position information	Traffic controller tiredness - Inadequate workload distribution	137
2				Flaws in traffic controller requirements definition process and/or training methodology	145
3				Unintuitive and / or error prone system manual - ground radar.	164
1	Flight crew lost on airport	TO32B4111211	Pilots or vehicle driver lose knowledge of aircraft position and 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
3				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
4				Pilot tiredness - Inadequate workload distribution	167
5				Flaws in pilot requirements definition process and/or training methodology	168
6				Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129
7				Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130
1	ATCO failure to clarify position reports	TO32B4111212	ATCO fails to clarify the incorrect position report by pilots or vehicle driver	Adverse weather / poor visibility conditions / darkness	6
2				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
5				Flaws in traffic controller requirements definition process and/or training methodology	145
6				Current airport diagram not reflecting critical changes	155
1	Inadequate airport ATCO coordination	TO32B411122	Airport ATCO fails to communicate adequately with approach/ ground controller	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 ATCO and approach or ground controller communication	163
1	Runway crossing movement	TO32B51	Aircraft or vehicle crosses runways to reach the terminal or another departure runway	Adverse weather / poor visibility conditions / darkness	6
2				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 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
9				Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130
1	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				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 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
1	Alternating take-off and landing	TO32B53	Runway used for alternating take-offs and landings	Emergency landing	8
2				Takeoff without clearance	157
3				Landing without clearance	158
4				Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	160
1	Incorrect runway entry point	TO32B54	Aircraft enters the end of a wrong runway, or enters runway unintendedly through an intermediate taxiway or intersection	Adverse weather / poor visibility conditions / darkness	6
2				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 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
1	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	Lack of English proficiency	132
2				Incorrect or confusing / misleading ATC instructions	133
3				Use of non-standard phraseology by pilot and/or controller	134
4				Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWY.	123
5				Lack of or poor communication quality	146
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

	Base event	Code	Definition	Identifiable Precursors	No.
8				Flaws in pilot requirements definition process and/or training methodology	168
1	19	RIMCAS not present	TO32B21	Runway Conflict Warning system is not installed or not in operation at the time	
2				Traffic controller tiredness - Inadequate workload distribution	137
3				Flaws in traffic controller requirements definition process and/or training methodology	145
4				Lack of adherence to SOP in terms of awareness on supporting systems (warning) - RIMCAS.	156
5				Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of Runway Conflict Warning System.	172
6				Runway confusion	1
7				Adverse weather / poor visibility conditions / darkness	6
8				Taxiway confusion	7
9				Emergency landing	8
10				Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWY.	123
11				Inadvertent deviation from cleared taxi route	131
12				Lack of English proficiency	132
13				Incorrect or confusing / misleading ATC instructions	133
14				Use of non-standard phraseology by pilot and/or controller	134
15				Traffic controller tiredness - Inadequate workload distribution	137
16				Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	139
17				Lack of adherence to SOP for GND movements.	141
18				Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.	142
19				Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	143
20				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
21				Flaws in traffic controller requirements definition process and/or training methodology	145
22				Lack of or poor communication quality	146
23				Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	148
24				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
25				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
26				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
27				Callsign confusion	154
28				Current airport diagram not reflecting critical changes	155
29				Takeoff without clearance	157
30				Landing without clearance	158
31				Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	160
32				Lack of adherence to SOP in terms of ATCO and approach or ground controller communication	163
33				Unintuitive and / or error prone system manual - ground radar.	164
34				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground Radar	165
35				Pilot tiredness - Inadequate workload distribution	167
36				Flaws in pilot requirements definition process and/or training methodology	168
37				Hearback omitted	169
38				Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ground radar at the airport.	170
39				Lack of adherence to SOP in terms of awareness on supporting systems (warning) - ground radar.	171
40				Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129
1	20	RIMCAS failure to give warning in time	TO32B22	Runway Conflict Warning system fails to alert ATCO in time of a conflict	
2				Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130
3				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
4				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - RCWS	205
5				Runway confusion	1
6				Adverse weather / poor visibility conditions / darkness	6
7				Taxiway confusion	7
8				Emergency landing	8
9				Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWY.	123
10				Inadvertent deviation from cleared taxi route	131
11				Lack of English proficiency	132
12				Incorrect or confusing / misleading ATC instructions	133
13				Use of non-standard phraseology by pilot and/or controller	134
14				Traffic controller tiredness - Inadequate workload distribution	137
15				Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	139
16				Lack of adherence to SOP for GND movements.	141
17				Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.	142
18				Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	143
19				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
20				Flaws in traffic controller requirements definition process and/or training methodology	145
21				Lack of or poor communication quality	146

	Base event	Code	Definition	Identifiable Precursors	No.
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 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 or / and passive contribution to the PF duties	151
25				Callsign confusion	154
26				Current airport diagram not reflecting critical changes	155
27				Takeoff without clearance	157
28				Landing without clearance	158
29				Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	160
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 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 omitted	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) - ground radar.	171
38				Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129
39				Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130
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				Traffic controller tiredness - Inadequate workload distribution	137
3				Flaws in traffic controller requirements definition process and/or training methodology	145
4				Runway confusion	1
5				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				Lack of English proficiency	132
11				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 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 the airsite and airport topology.	142
17				Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	143
18				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
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 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 or / and passive contribution to the PF duties	151
25				Callsign confusion	154
26				Current airport diagram not reflecting critical changes	155
27				Takeoff without clearance	157
28				Landing without clearance	158
29				Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	160
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 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 omitted	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) - ground radar.	171
38				Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129
39				Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130
1 22	Controller failure to resolve conflict in time	TO32B24	ATCO is alerted of the conflict but fails to resolve the conflict in time	Traffic controller tiredness - Inadequate workload distribution	137
2				Flaws in traffic controller requirements definition process and/or training methodology	145

	Base event	Code	Definition	Identifiable Precursors	No.
3				Lack of adherence to emergency procedures - RWY collision avoidance	135
4				Runway confusion	1
5				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				Lack of English proficiency	132
11				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 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 the airtaxi and airport topology.	142
17				Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	143
18				Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airtaxi or / and aircraft / vehicle proximity	144
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 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 or / and passive contribution to the PF duties	151
25				Callsign confusion	154
26				Current airport diagram not reflecting critical changes	155
27				Takeoff without clearance	157
28				Landing without clearance	158
29				Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	160
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 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 omitted	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) - ground radar.	171
38				Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129
39				Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130
1 23	Low visibility prevents conflict detection	TO32B111	ATCO fails to detect a conflict and give warning due to low visibility	Adverse weather / poor visibility conditions / darkness	6
2				Runway confusion	1
3				Adverse weather / poor visibility conditions / darkness	6
4				Taxiway confusion	7
5				Emergency landing	8
6				Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWY.	123
7				Inadvertent deviation from cleared taxi route	131
8				Lack of English proficiency	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	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 the airtaxi and airport topology.	142
15				Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	143
16				Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airtaxi 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 driver	148
20				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
21				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
22				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
23				Callsign confusion	154
24				Current airport diagram not reflecting critical changes	155
25				Takeoff without clearance	157
26				Landing without clearance	158

	Base event	Code	Definition	Identifiable Precursors	No.
27				Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	160
28				Lack of adherence to SOP in terms of ATCO and approach or ground controller 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 omitted	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
35				Lack of adherence to SOP in terms of awareness on supporting systems (warning) - ground radar.	171
36				Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129
37				Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130
1	24	Darkness prevents conflict detection	TO32B112	ATCO fails to detect a conflict and give warning due to darkness	6
2				Lack of adherence to ICAO Annex 14 and related documents in terms of airside lights distribution	147
3				Runway confusion	1
4				Adverse weather / poor visibility conditions / darkness	6
5				Taxiway confusion	7
6				Emergency landing	8
7				Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWY.	123
8				Inadvertent deviation from cleared taxi route	131
9				Lack of English proficiency	132
10				Incorrect or confusing / misleading ATC instructions	133
11				Use of non-standard phraseology by pilot and/or controller	134
12				Traffic controller tiredness - Inadequate workload distribution	137
13				Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	139
14				Lack of adherence to SOP for GND movements.	141
15				Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airside and airport topology.	142
16				Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	143
17				Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airside or / and aircraft / vehicle proximity	144
18				Flaws in traffic controller requirements definition process and/or training methodology	145
19				Lack of or poor communication quality	146
20				Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	148
21				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
22				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
23				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
24				Callsign confusion	154
25				Current airport diagram not reflecting critical changes	155
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
29				Lack of adherence to SOP in terms of ATCO and approach or ground controller communication	163
30				Unintuitive and / or error prone system manual - ground radar.	164
31				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground Radar	165
32				Pilot tiredness - Inadequate workload distribution	167
33				Flaws in pilot requirements definition process and/or training methodology	168
34				Hearback omitted	169
35				Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ground radar at the airport.	170
36				Lack of adherence to SOP in terms of awareness on supporting systems (warning) - ground radar.	171
37				Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129
38				Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130
1	25	Restricted view from tower prevents conflict detection	TO32B113	ATCO fails to detect a conflict and give warning due to the restricted view from tower	166
2				Runway confusion	1
3				Adverse weather / poor visibility conditions / darkness	6
4				Taxiway confusion	7
5				Emergency landing	8
6				Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWY.	123
7				Inadvertent deviation from cleared taxi route	131
8				Lack of English proficiency	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	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 the airside and airport topology.	142

	Base event	Code	Definition	Identifiable Precursors	No.
15				Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	143
16				Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airspace 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 driver	148
20				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
21				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
22				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
23				Callsign confusion	154
24				Current airport diagram not reflecting critical changes	155
25				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 landings	160
28				Lack of adherence to SOP in terms of ATCO and approach or ground controller 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 omitted	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
35				Lack of adherence to SOP in terms of awareness on supporting systems (warning) - ground radar.	171
36				Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129
37				Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130
1	26	ATCO failure to see visible aircraft in time	TO32B114	ATCO fails to detect a conflict and give warning due to ATCO's failure to see the aircraft	6
2				Adverse weather / poor visibility conditions / darkness	6
3				Traffic controller tiredness - Inadequate workload distribution	137
4				Flaws in traffic controller requirements definition process and/or training methodology	145
5				Runway confusion	1
6				Adverse weather / poor visibility conditions / darkness	6
7				Taxiway confusion	7
8				Emergency landing	8
9				Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWY.	123
10				Inadvertent deviation from cleared taxi route	131
11				Lack of English proficiency	132
12				Incorrect or confusing / misleading ATC instructions	133
13				Use of non-standard phraseology by pilot and/or controller	134
14				Traffic controller tiredness - Inadequate workload distribution	137
15				Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	139
16				Lack of adherence to SOP for GND movements.	141
17				Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airspace and airport topology.	142
18				Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	143
19				Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airspace or / and aircraft / vehicle proximity	144
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 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				Callsign confusion	154
27				Current airport diagram not reflecting critical changes	155
28				Takeoff without clearance	157
29				Landing without clearance	158
30				Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	160
31				Lack of adherence to SOP in terms of ATCO and approach or ground controller communication	163
32				Unintuitive and / or error prone system manual - ground radar.	164
33				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground Radar	165
34				Pilot tiredness - Inadequate workload distribution	167
35				Flaws in pilot requirements definition process and/or training methodology	168
36				Hearback omitted	169
37				Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ground radar at the airport.	170
38				Lack of adherence to SOP in terms of awareness on supporting systems (warning) - ground radar.	171

	Base event	Code	Definition	Identifiable Precursors	No.
38				Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129
39				Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130
1	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	
2				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	137
5				Flaws in traffic controller requirements definition process and/or training methodology	145
6				Lack of or poor communication quality	146
7				Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	148
8				Runway confusion	1
9				Adverse weather / poor visibility conditions / darkness	6
10				Taxiway confusion	7
11				Emergency landing	8
12				Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWY.	123
13				Inadvertent deviation from cleared taxi route	131
14				Lack of English proficiency	132
15				Incorrect or confusing / misleading ATC instructions	133
16				Use of non-standard phraseology by pilot and/or controller	134
17				Traffic controller tiredness - Inadequate workload distribution	137
18				Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	139
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 the airsite and airport topology.	142
21				Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	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
23				Flaws in traffic controller requirements definition process and/or training 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 driver	148
26				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
27				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
28				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
29				Callsign confusion	154
30				Current airport diagram not reflecting critical changes	155
31				Takeoff without clearance	157
32				Landing without clearance	158
33				Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	160
34				Lack of adherence to SOP in terms of ATCO and approach or ground controller communication	163
35				Unintuitive and / or error prone system manual - ground radar.	164
36				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground Radar	165
37				Pilot tiredness - Inadequate workload distribution	167
38				Flaws in pilot requirements definition process and/or training methodology	168
39				Hearback omitted	169
40				Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ground radar at the airport.	170
41				Lack of adherence to SOP in terms of awareness on supporting systems (warning) - ground radar.	171
42				Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129
1	28	Aircraft using runway	TO32B3	Given a runway incursion, another aircraft is present on the runway, thus creating a conflict	
2				not identifiable at the moment	
3				Runway confusion	1
4				Adverse weather / poor visibility conditions / darkness	6
5				Taxiway confusion	7
6				Emergency landing	8
7				Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWY.	123
8				Inadvertent deviation from cleared taxi route	131
9				Lack of English proficiency	132
10				Incorrect or confusing / misleading ATC instructions	133
11				Use of non-standard phraseology by pilot and/or controller	134
12				Traffic controller tiredness - Inadequate workload distribution	137
13				Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	139
14				Lack of adherence to SOP for GND movements.	141
15				Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.	142
16				Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	143
17				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
18				Flaws in traffic controller requirements definition process and/or training methodology	145
19				Lack of or poor communication quality	146

	Base event	Code	Definition	Identifiable Precursors	No.
19				Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	148
20				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
21				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
22				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
23				Callsign confusion	154
24				Current airport diagram not reflecting critical changes	155
25				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 landings	160
28				Lack of adherence to SOP in terms of ATCO and approach or ground controller 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 omitted	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
35				Lack of adherence to SOP in terms of awareness on supporting systems (warning) - ground radar.	171
36				Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129
37				Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130
1 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	not identifiable at the moment	
2				Runway confusion	1
3				Adverse weather / poor visibility conditions / darkness	6
4				Taxiway confusion	7
5				Emergency landing	8
6				Lack of adherence to SOP for take-off procedure in terms of maintaining adequate separation on the RWY.	123
7				Inadvertent deviation from cleared taxi route	131
8				Lack of English proficiency	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	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 the airsite and airport topology.	142
15				Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	143
16				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
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 driver	148
20				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
21				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
22				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
23				Callsign confusion	154
24				Current airport diagram not reflecting critical changes	155
25				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 landings	160
28				Lack of adherence to SOP in terms of ATCO and approach or ground controller 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 omitted	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
35				Lack of adherence to SOP in terms of awareness on supporting systems (warning) - ground radar.	171
36				Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129
37				Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130
38				Adverse weather / poor visibility conditions / darkness	6
39				Incorrect or confusing / misleading ATC instructions	133
40				Use of non-standard phraseology by pilot and/or controller	134
41				Lack of adherence to emergency procedures - RWY collision avoidance	135
42				Traffic controller tiredness - Inadequate workload distribution	137
43				Flaws in traffic controller requirements definition process and/or training methodology	145

	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 airspace lights distribution	147
46				Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	148
47				Flaws in maintenance technician / airworthiness specialist requirements definition 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 of the system / product compliance with requirements - RCWS	205
50				Lack of adherence to ICAO Annex 14 and related documents in terms of nonrestricted view on airspace from TWR	166
51				Lack of adherence to SOP in terms of awareness on supporting systems (warning) - RIMCAS.	156
52				Lack of adherence to the current technology standards in terms of flight safety 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 airspace 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
4				Runway confusion	1
5				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				Lack of English proficiency	132
11				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 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 the airspace and airport topology.	142
17				Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	143
18				Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airspace or / and aircraft / vehicle proximity	144
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 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 or / and passive contribution to the PF duties	151
25				Callsign confusion	154
26				Current airport diagram not reflecting critical changes	155
27				Takeoff without clearance	157
28				Landing without clearance	158
29				Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	160
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 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 omitted	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) - ground radar.	171			
38	Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129			
39	Flaws in vehicle driver / equipment operator / ground agent requirements definition 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	Lack of adherence to emergency procedures - RWY collision avoidance	135			
44	Traffic controller tiredness - Inadequate workload distribution	137			
45	Flaws in traffic controller requirements definition process and/or training methodology	145			
46	Lack of or poor communication quality	146			
47	Lack of adherence to ICAO Annex 14 and related documents in terms of airspace lights distribution	147			
48	Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	148			
49	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149			
50	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150			
51			Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - RCWS	205	

	Base event	Code	Definition	Identifiable Precursors	No.
52				Lack of adherence to ICAO Annex 14 and related documents in terms of nonrestricted view on airside from TWR	166
53				Lack of adherence to SOP in terms of awareness on supporting systems (warning) - RIMCAS.	156
54				Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of Runway Conflict Warning System.	172
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 airside 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
4				Runway confusion	1
5				Adverse weather / poor visibility conditions / darkness	6
6				Taxiway confusion	7
7				Emergency landing	8
8					
9				Inadvertent deviation from cleared taxi route	131
10				Lack of English proficiency	132
11				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 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 the airside and airport topology.	142
17				Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	143
18				Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airside or / and aircraft / vehicle proximity	144
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 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 or / and passive contribution to the PF duties	151
25				Callsign confusion	154
26				Current airport diagram not reflecting critical changes	155
27				Takeoff without clearance	157
28				Landing without clearance	158
29				Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	160
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 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 omitted	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) - ground radar.	171
38				Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129
39				Flaws in vehicle driver / equipment operator / ground agent requirements definition 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				Lack of adherence to emergency procedures - RWY collision avoidance	135
44				Traffic controller tiredness - Inadequate workload distribution	137
45				Flaws in traffic controller requirements definition process and/or training 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 distribution	147
48				Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	148
49				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
50				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
51				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - RCWS	205
52				Lack of adherence to ICAO Annex 14 and related documents in terms of nonrestricted view on airside from TWR	166
53				Lack of adherence to SOP in terms of awareness on supporting systems (warning) - RIMCAS.	156
54				Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of Runway Conflict Warning System.	172
ESD 36	Ground collision imminent	Code	Definition	Identifiable Precursors	
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	Adverse weather / poor visibility conditions / darkness	6
2				Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129

	Base event	Code	Definition	Identifiable Precursors	No.
3				Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130
4				Lack of adherence to SOP for GND movements.	141
1 2	Ground equipment fault	TO36F1112	Deviation from procedures in positioning or moving equipment (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	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	128
3				Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129
4				Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130
5				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	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 or / and passive contribution to the PF duties	151
3				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 from procedures	TO36F11212	Other aircraft being pushed back or taxied nearby deviates from the intended trajectory	Adverse weather / poor visibility conditions / darkness	6
2				Flaws in ground equipment maintenance process	128
3				Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129
4				Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130
5				Lack of adherence to SOP for GND movements. Poor execution of parking / docking / pushback procedure	138
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				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 the airsite and airport topology.	142
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
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
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				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	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
1 10	Ineffective ground crew - flight crew communication	TO36F1214	Deviation from intended pushback trajectory due to ineffective communication between ground crew and flight crew	Lack of adherence to SOP for GND movements in terms of flight crew - ground crew communication.	126
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				Pilot tiredness - Inadequate workload distribution	167
5				Flaws in pilot requirements definition process and/or training methodology	168
1 11	Pushback deviation creates conflict	TO36F122	Deviation from the intended pushback trajectory causes imminent collision	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				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 SOP for GND movements. Lack of awareness in terms of current situation on the airsite or / and aircraft / vehicle proximity	144
6				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment	261
1 12	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	Adverse weather / poor visibility conditions / darkness	6

Base event		Code	Definition	Identifiable Precursors	No.	
2				Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	127	
3				Lack of English proficiency	132	
4				Incorrect or confusing / misleading ATC instructions	133	
5				Use of non-standard phraseology by pilot and/or controller	134	
6				Traffic controller tiredness - Inadequate workload distribution	137	
7				Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	143	
8				Flaws in traffic controller requirements definition process and/or training methodology	145	
9				Lack of or poor communication quality	146	
10				Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	148	
1	13	Ground crew error in marshalling off stand	TO36F1312	Deviation from intended taxi trajectory due to marshalling error	Lack of adherence to SOP for GND movements in terms of marshalling procedure	125
2				Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130	
3				Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129	
1	14	Flight crew misjudgement of separation in taxi	TO36F1313	Deviation from intended taxi-out trajectory due to flight crew misjudgement of separation	Adverse weather / poor visibility conditions / darkness	6
2				Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications	140	
3				Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airtaxi and airport topology.	142	
4				Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	143	
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				Pilot tiredness - Inadequate workload distribution	167	
7				Flaws in pilot requirements definition process and/or training methodology	168	
1	15	Movement of other aircraft deviates from procedures	TO36F1314	Deviation from intended taxi trajectory by another taxiing aircraft	Adverse weather / poor visibility conditions / darkness	6
2				Inadvertent deviation from cleared taxi route	131	
3				Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications	140	
4				Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airtaxi and airport topology.	142	
5				Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	143	
6				Pilot tiredness - Inadequate workload distribution	167	
7				Flaws in pilot requirements definition process and/or training methodology	168	
1	16	Taxi-out deviation creates conflict with aircraft	TO36F132	Deviation from the intended taxi-out trajectory causes imminent collision	Adverse weather / poor visibility conditions / darkness	6
2				Taxiway incursion	9	
3				Inadvertent deviation from cleared taxi route	131	
4				Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications	140	
5				Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airtaxi and airport topology.	142	
6				Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	143	
7				Pilot tiredness - Inadequate workload distribution	167	
8				Flaws in pilot requirements definition process and/or training methodology	168	
1	17	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	Adverse weather / poor visibility conditions / darkness	6
2				Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	127	
3				Lack of English proficiency	132	
4				Incorrect or confusing / misleading ATC instructions	133	
5				Use of non-standard phraseology by pilot and/or controller	134	
6				Traffic controller tiredness - Inadequate workload distribution	137	
7				Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	143	
8				Flaws in traffic controller requirements definition process and/or training methodology	145	
9				Lack of or poor communication quality	146	
10				Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	148	
1	18	Inadequate stand allocation	TO36F1412	Allocation of wrong stand for aircraft	Stand confusion	10
2				Traffic controller tiredness - Inadequate workload distribution	137	
3				Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airtaxi and airport topology.	142	
4				Flaws in traffic controller requirements definition process and/or training methodology	145	
1	19	Aircraft fault causes deviation in taxi-in	TO36F14131	Deviation from intended taxi-in trajectory due to aircraft fault (e.g. brake failure)	Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure)	124
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				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	
1	20	Flight crew handling error in taxi-in	TO36F14132	Deviation from intended taxi-in trajectory due to flight crew handling error	Flaws in traffic controller requirements definition process and/or training methodology	145
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				Inadequate stall recovery procedure for the aircraft	152	
4				Traffic controller tiredness - Inadequate workload distribution	137	
5				Lack of adherence to SOP for GND movements.	141	

	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					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
3					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 stand	TO36F14134	Deviation from intended taxi-in trajectory due to marshalling error	Adverse weather / poor visibility conditions / darkness	6
2					Lack of adherence to SOP for GND movements in terms of marshalling procedure	125
3					Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129
4					Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130
1	23	Ground agent error in moving equipment	TO36F14141	Deviation from intended taxi-in trajectory due to ground agent error in moving equipment	Adverse weather / poor visibility conditions / darkness	6
2					Taxiway incursion	9
3					Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129
4					Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130
5					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
4					Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130
5					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment	261
1	25	Taxi-in deviation creates conflict	TO36F142	Deviation from the intended taxi-in trajectory causes imminent collision	Adverse weather / poor visibility conditions / darkness	6
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					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
3					Taxiway incursion	9
4					Stand confusion	10
5					Flaws in manufacturer quality control process - taxiing related control system (e.g. 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 communication.	126
8					Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	127
9					Flaws in ground equipment maintenance process	128
10					Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129
11					Flaws in vehicle driver / equipment operator / ground agent requirements definition 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 / pushback procedure	138
18					Lack of adherence to SOP for GND movements. Lack of awareness of other traffic 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 the airside and airport topology.	142
21					Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	143
22					Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airside or / and aircraft / vehicle proximity	144
23					Flaws in traffic controller requirements definition process and/or training 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 driver	148
26					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 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					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
31					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment	261
1	27	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	Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airside or / and aircraft / vehicle proximity	144
2					Adverse weather / poor visibility conditions / darkness	6

	Base event	Code	Definition	Identifiable Precursors	No.
3				Taxiway incursion	9
4				Stand confusion	10
5				Flaws in manufacturer quality control process - taxiing related control system (e.g. 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 communication.	126
8				Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	127
9				Flaws in ground equipment maintenance process	128
10				Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129
11				Flaws in vehicle driver / equipment operator / ground agent requirements definition 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 /pushback procedure	138
18				Lack of adherence to SOP for GND movements. Lack of awareness of other traffic 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 the airsite and airport topology.	142
21				Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	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
23				Flaws in traffic controller requirements definition process and/or training 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 driver	148
26				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 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				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
31				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment	261
1 28	Flight crew misjudgement of clearance	TO36B23	Flight crew fail to avoid conflict because they misjudge the clearance	Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	143
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
5				Taxiway incursion	9
6				Stand confusion	10
7				Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure)	124
8				Lack of adherence to SOP for GND movements in terms of marshalling procedure	125
9				Lack of adherence to SOP for GND movements in terms of flight crew - ground crew communication.	126
10				Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	127
11				Flaws in ground equipment maintenance process	128
12				Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129
13				Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130
14				Inadvertent deviation from cleared taxi route	131
15				Lack of English proficiency	132
16				Incorrect or confusing / misleading ATC instructions	133
17				Use of non-standard phraseology by pilot and/or controller	134
18				Traffic controller tiredness - Inadequate workload distribution	137
19				Lack of adherence to SOP for GND movements. Poor execution of parking / docking /pushback procedure	138
20				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
22				Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.	142
23				Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	143
24				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
25				Flaws in traffic controller requirements definition process and/or training methodology	145
26				Lack of or poor communication quality	146
27				Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	148
28				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
29				Current airport diagram not reflecting critical changes	155
30				Pilot tiredness - Inadequate workload distribution	167
31				Flaws in pilot requirements definition process and/or training methodology	168

	Base event	Code	Definition	Identifiable Precursors	No.
32				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
33				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment	261
1	29	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	
2				Lack of adherence to emergency procedures - RWY collision avoidance	135
3				Pilot tiredness - Inadequate workload distribution	167
4				Flaws in pilot requirements definition process and/or training methodology	168
5				Adverse weather / poor visibility conditions / darkness	6
6				Taxiway incursion	9
7				Stand confusion	10
8				Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure)	124
9				Lack of adherence to SOP for GND movements in terms of marshalling procedure	125
10				Lack of adherence to SOP for GND movements in terms of flight crew - ground crew communication.	126
11				Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	127
12				Flaws in ground equipment maintenance process	128
13				Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129
14				Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130
15				Inadvertent deviation from cleared taxi route	131
16				Lack of English proficiency	132
17				Incorrect or confusing / misleading ATC instructions	133
18				Use of non-standard phraseology by pilot and/or controller	134
19				Traffic controller tiredness - Inadequate workload distribution	137
20				Lack of adherence to SOP for GND movements. Poor execution of parking / docking /pushback procedure	138
21				Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications	140
22				Lack of adherence to SOP for GND movements.	141
23				Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airtaxi and airport topology.	142
24				Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	143
25				Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airtaxi or / and aircraft / vehicle proximity	144
26				Flaws in traffic controller requirements definition process and/or training methodology	145
27				Lack of or poor communication quality	146
28				Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	148
29				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
30				Current airport diagram not reflecting critical changes	155
31				Pilot tiredness - Inadequate workload distribution	167
32				Flaws in pilot requirements definition process and/or training methodology	168
33				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
33				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment	261
1	30	Avoidance impracticable for ground crew	TO36B11	Conflict cannot be avoided by ground crew	
2				not identifiable on that level	
3				Adverse weather / poor visibility conditions / darkness	6
4				Taxiway incursion	9
5				Stand confusion	10
6				Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure)	124
7				Lack of adherence to SOP for GND movements in terms of marshalling procedure	125
8				Lack of adherence to SOP for GND movements in terms of flight crew - ground crew communication.	126
9				Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	127
10				Flaws in ground equipment maintenance process	128
11				Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129
12				Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130
13				Inadvertent deviation from cleared taxi route	131
14				Lack of English proficiency	132
15				Incorrect or confusing / misleading ATC instructions	133
16				Use of non-standard phraseology by pilot and/or controller	134
17				Traffic controller tiredness - Inadequate workload distribution	137
18				Lack of adherence to SOP for GND movements. Poor execution of parking / docking /pushback procedure	138
19				Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications	140
20				Lack of adherence to SOP for GND movements.	141
21				Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airtaxi and airport topology.	142
22				Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	143
23				Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airtaxi or / and aircraft / vehicle proximity	144
23				Flaws in traffic controller requirements definition process and/or training methodology	145

	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 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				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
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	135
33				Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	143
34				Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airtaxi or / and aircraft / vehicle proximity	144
35				Pilot tiredness - Inadequate workload distribution	167
36				Flaws in pilot requirements definition process and/or training methodology	168
1 31	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	Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airtaxi or / and aircraft / vehicle proximity	144
2				Adverse weather / poor visibility conditions / darkness	6
3				Taxiway incursion	9
4				Stand confusion	10
5				Flaws in manufacturer quality control process - taxiing related control system (e.g. 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 communication.	126
8				Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	127
9				Flaws in ground equipment maintenance process	128
10				Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129
11				Flaws in vehicle driver / equipment operator / ground agent requirements definition 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 / pushback procedure	138
18				Lack of adherence to SOP for GND movements. Lack of awareness of other traffic 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 the airtaxi and airport topology.	142
21				Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	143
22				Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airtaxi or / and aircraft / vehicle proximity	144
23				Flaws in traffic controller requirements definition process and/or training 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 driver	148
26				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 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				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
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	135
33				Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	143
34				Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airtaxi or / and aircraft / vehicle proximity	144
35				Pilot tiredness - Inadequate workload distribution	167
36				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
2				Flaws in vehicle driver / equipment operator / ground agent requirements definition 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				Taxiway incursion	9
6				Stand confusion	10
7				Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure)	124
8				Lack of adherence to SOP for GND movements in terms of marshalling procedure	125
9				Lack of adherence to SOP for GND movements in terms of flight crew - ground crew communication.	126
10				Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	127

	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	
13				Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130	
14				Inadvertent deviation from cleared taxi route	131	
15				Lack of English proficiency	132	
16				Incorrect or confusing / misleading ATC instructions	133	
17				Use of non-standard phraseology by pilot and/or controller	134	
18				Traffic controller tiredness - Inadequate workload distribution	137	
19				Lack of adherence to SOP for GND movements. Poor execution of parking / docking /pushback procedure	138	
20				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	
22				Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.	142	
23				Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	143	
24				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	
25				Flaws in traffic controller requirements definition process and/or training methodology	145	
26				Lack of or poor communication quality	146	
27				Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	148	
28				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151	
29				Current airport diagram not reflecting critical changes	155	
30				Pilot tiredness - Inadequate workload distribution	167	
31				Flaws in pilot requirements definition process and/or training methodology	168	
32				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	
33				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment	261	
34				Lack of adherence to emergency procedures - RWY collision avoidance	135	
35				Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	143	
36				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	
37				Pilot tiredness - Inadequate workload distribution	167	
38				Flaws in pilot requirements definition process and/or training methodology	168	
1	33	Inadequate ground crew - flight crew communication	TO36B14	Ground crew fail to communicate with flight crew as necessary to avoid conflict	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	
3				Lack of adherence to SOP for GND movements.	141	
4				Adverse weather / poor visibility conditions / darkness	6	
5				Adverse weather / poor visibility conditions / darkness	6	
6				Taxiway incursion	9	
7				Stand confusion	10	
8				Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure)	124	
9				Lack of adherence to SOP for GND movements in terms of marshalling procedure	125	
10				Lack of adherence to SOP for GND movements in terms of flight crew - ground crew communication.	126	
11				Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	127	
12				Flaws in ground equipment maintenance process	128	
13				Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129	
14				Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130	
15				Inadvertent deviation from cleared taxi route	131	
16				Lack of English proficiency	132	
17				Incorrect or confusing / misleading ATC instructions	133	
18				Use of non-standard phraseology by pilot and/or controller	134	
19				Traffic controller tiredness - Inadequate workload distribution	137	
20				Lack of adherence to SOP for GND movements. Poor execution of parking / docking /pushback procedure	138	
21				Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications	140	
22				Lack of adherence to SOP for GND movements.	141	
23				Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.	142	
24				Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	143	
25				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	
26				Flaws in traffic controller requirements definition process and/or training methodology	145	
27				Lack of or poor communication quality	146	
28				Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	148	
29				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151	
30				Current airport diagram not reflecting critical changes	155	
31				Pilot tiredness - Inadequate workload distribution	167	
32				Flaws in pilot requirements definition process and/or training methodology	168	

	Base event	Code	Definition	Identifiable Precursors	No.
33				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
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
36				Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	143
37				Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airtaxi 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

Base events		Code	Definition	Identifiable Precursors	No.
ESD 5	Base events	Code	Definition	Identifiable Precursors	No.
	Incorrect configuration			Incorrect configuration	
1	1 Unsuccessful TO configuration checklist	TO05B111	Co-pilot fails to determine the position of the flap and slats required for a successful take-off	Pilot tiredness - Inadequate workload distribution	167
2				Flaws in pilot requirements definition process and/or training methodology	168
3				Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.	198
4				Incorrect stab-trim setting	258
5				Undetected incorrect takeoff configuration	259
1	2 Unsuccessful Checklist Verification	TO05B112	Captain fails to identify the incorrect position of the flap and slats 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
1	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 the stand	Unintuitive and / or error prone system manual - FMC	217
2				Pilot tiredness - Inadequate workload distribution	167
3				Flaws in pilot requirements definition process and/or training methodology	168
1	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				Flaws in pilot requirements definition process and/or training methodology	168
3				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
4				Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201
1	5 Verification unsuccessful	TO05B22	Captain performs the take-off configuration check but fails to notice that the aircraft is configured incorrectly.	Pilot tiredness - Inadequate workload distribution	167
2				Flaws in pilot requirements definition process and/or training methodology	168
1	6 Unsuccessful Manufacture	TO05B311	TOCW system fails due to unsuccessful manufacture and hence the take-off is not rejected	Inadequate certification process and / or flaws in methodology concerning verification 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
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				Unintuitive and / or error prone system manual - ground radar.	164
6				Unintuitive and / or error prone system manual - FMC	217
7				Flaws in pilot requirements definition process and/or training methodology	168
8				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 configuration before application of take-off power.	201
10				Incorrect stab-trim setting	258
11				Undetected incorrect takeoff configuration	259
1	7 Unsuccessful Maintenance	TO05B312	TOCW system fails due to unsuccessful maintenance and hence the take-off is not rejected	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				Flaws in aircraft system maintenance process definition - TOCW System	204
4				System failure affecting aircraft configuration, controllability and/or flying qualities	25
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
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
10				Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201
11				Incorrect stab-trim setting	258
12				Undetected incorrect takeoff configuration	259
1	8 Unsuccessful Operation	TO05B313	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 circuit breaker following testing	Incorrect use of automation - TOCW System	192
2				Pilot tiredness - Inadequate workload distribution	167
3				Flaws in pilot requirements definition process and/or training methodology	168
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				Unintuitive and / or error prone system manual - TOCW	219
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				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
11				Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201
12				Incorrect stab-trim setting	258
13				Undetected incorrect takeoff configuration	259
1	9 Unsuccessful Manufacture	TO05B321	TOCW power supply fails due to unsuccessful manufacture and hence the take-off is not rejected	Flaws in manufacturer quality control process - Power supply system components	238
2				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components	230
3				System failure affecting the operation of primary instruments / displays or standby instruments	26
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				Unintuitive and / or error prone system manual - FMC	217
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 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 configuration before application of take-off power.	201	
10				Incorrect stab-trim setting	258	
11				Undetected incorrect takeoff configuration	259	
1	10	Unsuccessful Maintenance	TO05B322	TOCW power supply fails due to unsuccessful maintenance and hence the take-off is not rejected	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				Flaws in aircraft system maintenance process definition - Electrical wiring System	252	
4				System failure affecting the operation of primary instruments / displays or standby instruments	26	
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	
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	
10				Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201	
11				Incorrect stab-trim setting	258	
12				Undetected incorrect takeoff configuration	259	
1	11	Aircraft takes-off with incorrect configuration	TO05B33	Aircraft is still able to take-off even with the incorrect configuration	not identifiable at the moment	
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				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	168	
6				Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.	198	
7				Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201	
8				Incorrect stab-trim setting	258	
9				Undetected incorrect takeoff configuration	259	
1	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	Cautions / warnings (genuine or spurious) that may lead to a low-speed or high-speed rejected take-off	46
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				Pilot tiredness - Inadequate workload distribution	167	
4				Flaws in pilot requirements definition process and/or training methodology	168	
5				Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207	
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				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	
11				Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201	
12				Incorrect stab-trim setting	258	
13				Undetected incorrect takeoff configuration	259	
1	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-off	Cautions / warnings (genuine or spurious) that may lead to a low-speed or high-speed rejected take-off	46
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, adherence to SOP, criteria for STOP 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	
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	
10				Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201	
11				Incorrect stab-trim setting	258	
12				Undetected incorrect takeoff configuration	259	
1	14	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 probability.	not identifiable at that level	
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				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	168	
6				Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.	198	
7				Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201	
8				Incorrect stab-trim setting	258	
9				Undetected incorrect takeoff configuration	259	
1	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.	Adverse weather in terms of heavy rain or icing conditions resulted with decreased 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	

5				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
6				High energy RTO rate is an indicator of improper Operator's policy for T/O operations.	211
7				Gross error in takeoff weight entry and/or in V1 / VR speeds assessment	179
8				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
9				Unintuitive and / or error prone system manual - FMC	217
10				Pilot tiredness - Inadequate workload distribution	167
11				Flaws in pilot requirements definition process and/or training methodology	168
12				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 configuration before application of take-off power.	201
14				Incorrect stab-trim setting	258
15				Undetected incorrect takeoff configuration	259
16				Cautions / warnings (genuine or spurious) that may lead to a low-speed or high-speed rejected take-off	46
17				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
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, adherence to SOP, criteria for STOP decision	207
1	16	Brakes not functioning correctly	TO05B52	Brakes are not giving maximum braking, e.g. because of improper maintenance and damages	
2				System failure affecting aircraft configuration, controllability and/or flying qualities	25
3				Pilot tiredness - Inadequate workload distribution	167
4				Flaws in pilot requirements definition process and/or training methodology	168
5				Flaws in aircraft system maintenance process definition - Braking system related components	268
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				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
11				Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201
12				Incorrect stab-trim setting	258
13				Undetected incorrect takeoff configuration	259
14				Cautions / warnings (genuine or spurious) that may lead to a low-speed or high-speed rejected take-off	46
15				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
16				Pilot tiredness - Inadequate workload distribution	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
1	17	Brakes not applied correctly	TO05B53	Failure of the flight crew to apply all the braking systems immediately after take-off rejection.	
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, braking initiation sequence	199
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
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
10				Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201
11				Incorrect stab-trim setting	258
12				Undetected incorrect takeoff configuration	259
13				Cautions / warnings (genuine or spurious) that may lead to a low-speed or high-speed rejected take-off	46
14				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 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				Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207
1	18	Stall Unavoidable	TO05B61	No input to controls will allow the flight crew to avoid the stall	
2				not identifiable at that level	
3				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
4				Unintuitive and / or error prone system manual - FMC	217
5				Pilot tiredness - Inadequate workload distribution	167
6				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 configuration.	198
8				Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201
9				Incorrect stab-trim setting	258
10				Undetected incorrect takeoff configuration	259
11				Cautions / warnings (genuine or spurious) that may lead to a low-speed or high-speed rejected take-off	46
12				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
13				Pilot tiredness - Inadequate workload distribution	167
14				Flaws in pilot requirements definition process and/or training methodology	168
15				Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207
16					
17				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
18				Pilot tiredness - Inadequate workload distribution	167
19				Flaws in pilot requirements definition process and/or training methodology	168
20				Incorrect use of automation - TOCW System	192
21				Flaws in aircraft system maintenance process definition - TOCW System	204

19				Unintuitive and / or error prone system manual - TOCW	219
20				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System	229
21				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system 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
1	19	Pilot ignores stickshaker	TO05B622	Flight crew take no action to the activated stick-shaker	
2				Lack of adherence to SOP in terms of awareness on supporting systems warning - stickshaker	197
3				Pilot tiredness - Inadequate workload distribution	167
4				Flaws in pilot requirements definition process and/or training methodology	168
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
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
10				Lack of adherence to SOP for take-off procedure in terms of checking take-off 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	25
14				System failure affecting the operation of primary instruments / displays or standby instruments	26
15				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
16				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
17				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
18				Pilot tiredness - Inadequate workload distribution	167
19				Flaws in pilot requirements definition process and/or training methodology	168
20				Incorrect use of automation - TOCW System	192
21				Flaws in aircraft system maintenance process definition - TOCW System	204
22				Unintuitive and / or error prone system manual - TOCW	219
23				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System	229
24				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components	230
25				Flaws in manufacturer quality control process - Power supply system components	238
1	20	Stick shaker failure	TO05B6211	Stick-shaker fails due to improper manufacture or maintenance	
2				System failure affecting the operation of primary instruments / displays or standby instruments	26
3				Flaws in aircraft system maintenance process definition - stickshaker	136
4				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
5				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
6				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - stickshaker system components	161
7				Flaws in manufacturer quality control process - Stickshaker system components	266
8				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
9				Unintuitive and / or error prone system manual - FMC	217
10				Pilot tiredness - Inadequate workload distribution	167
11				Flaws in pilot requirements definition process and/or training methodology	168
12				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 configuration before application of take-off power.	201
14				Incorrect stab-trim setting	258
15				Undetected incorrect takeoff configuration	259
16				System failure affecting aircraft configuration, controllability and/or flying qualities	25
17				System failure affecting the operation of primary instruments / displays or standby instruments	26
18				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
19				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
20				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
21				Pilot tiredness - Inadequate workload distribution	167
22				Flaws in pilot requirements definition process and/or training methodology	168
23				Incorrect use of automation - TOCW System	192
24				Flaws in aircraft system maintenance process definition - TOCW System	204
25				Unintuitive and / or error prone system manual - TOCW	219
26				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System	229
27				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components	230
28				Flaws in manufacturer quality control process - Power supply system components	238
1	21	Stall AOA too low	TO05B6212	Stall occurs at an AOA that is less than the AOA required to activate the stick-shaker	
2				Flaws in aircraft system maintenance process definition - Electrical wiring System	252
3				Contaminated wing	12
4				Extreme icing conditions encounter	20
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
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

8				Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201
9				Incorrect stab-trim setting	258
10				Undetected incorrect takeoff configuration	259
11				System failure affecting aircraft configuration, controllability and/or flying qualities	25
12				System failure affecting the operation of primary instruments / displays or standby instruments	26
13				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
14				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
15				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
16				Pilot tiredness - Inadequate workload distribution	167
17				Flaws in pilot requirements definition process and/or training methodology	168
18				Incorrect use of automation - TOCW System	192
19				Flaws in aircraft system maintenance process definition - TOCW System	204
20				Unintuitive and / or error prone system manual - TOCW	219
21				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System	229
22				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components	230
23				Flaws in manufacturer quality control process - Power supply system components	238
24				Flaws in aircraft system maintenance process definition - Electrical wiring System	252
1	22 Uncontrollable	TO05B71	No input to controls will allow the flight crew to maintain control of the aircraft.	not identifiable at the moment	
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				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	168
6				Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.	198
7				Lack of adherence to SOP for take-off procedure in terms of checking take-off 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
11				System failure affecting the operation of primary instruments / displays or standby instruments	26
12				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
13				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
14				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 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				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System	229
21				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system 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
24				Contaminated wing	12
25				Extreme icing conditions encounter	20
26				System failure affecting the operation of primary instruments / displays or standby instruments	26
27				Flaws in aircraft system maintenance process definition - stickshaker	136
28				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
29				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
6				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - stickshaker system components	161
31				Pilot tiredness - Inadequate workload distribution	167
32				Flaws in pilot requirements definition process and/or training methodology	168
33				Inadequate aircraft de-icing / anti-icing	180
34				Lack of adherence to SOP in terms of awareness on supporting systems warning - stickshaker	197
35				Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing	208
36				Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.	210
37				Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT)	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				Lack of adherence to SOP in terms of de-icing / anti-icing procedures.	232
1	23 Lack of control	TO05B72	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 AFM in terms of emergency procedures - stall recovery	292
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				Unintuitive and / or error prone system manual - FMC	217
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 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 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

13				System failure affecting the operation of primary instruments / displays or standby instruments	26
14				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
15				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
16				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				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 of the system / product compliance with requirements - TOCW System	229
23				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system 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
26				Contaminated wing	12
27				Extreme icing conditions encounter	20
28				System failure affecting the operation of primary instruments / displays or standby instruments	26
29				Flaws in aircraft system maintenance process definition - stickshaker	136
6				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
31				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
32				Inadequate certification process and / or flaws in methodology concerning verification 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
40				Applied de-icing / anti-icing method is not sufficient for predicted conditions	228
41				Lack of adherence to SOP in terms of aircraft icing (condition) monitoring	231
42				Lack of adherence to SOP in terms of de-icing / anti-icing procedures.	232
1	24	Incorrect Control	TO05B73	The pilot applies incorrect control to the aircraft. This can be due to improper training, stress and fatigue	
2				Flaws in pilot requirements definition process and/or training methodology	168
3				Pilot tiredness - Inadequate workload distribution	167
4				Lack of adherence to AFM in terms of emergency procedures - stall recovery	292
5				Inadequate stall recovery procedure for the aircraft	152
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				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
11				Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201
12				Incorrect stab-trim setting	258
13				Undetected incorrect takeoff configuration	259
14				System failure affecting aircraft configuration, controllability and/or flying qualities	25
15				System failure affecting the operation of primary instruments / displays or standby instruments	26
16				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
17				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
18				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 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	168
21				Incorrect use of automation - TOCW System	192
22				Flaws in aircraft system maintenance process definition - TOCW System	204
23				Unintuitive and / or error prone system manual - TOCW	219
24				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System	229
25				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components	230
26				Flaws in manufacturer quality control process - Power supply system components	238
27				Flaws in aircraft system maintenance process definition - Electrical wiring System	252
28				Contaminated wing	12
29				Extreme icing conditions encounter	20
6				System failure affecting the operation of primary instruments / displays or standby instruments	26
31				Flaws in aircraft system maintenance process definition - stickshaker	136
32				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
33				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
34				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - stickshaker system components	161
35				Pilot tiredness - Inadequate workload distribution	167
36				Flaws in pilot requirements definition process and/or training methodology	168
37				Inadequate aircraft de-icing / anti-icing	180
38				Lack of adherence to SOP in terms of awareness on supporting systems warning - stickshaker	197
39				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
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 (condition) monitoring	231
43				Lack of adherence to SOP in terms of de-icing / anti-icing procedures.	232
1	25	Insufficient control	TO05B74	The pilot applies correct measures but are not enough to prevent aircraft leaving off the side of the runway	
2				Flaws in pilot requirements definition process and/or training methodology	168
3				Pilot tiredness - Inadequate workload distribution	167
4				Lack of adherence to AFM in terms of emergency procedures - stall recovery	292
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
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
10				Lack of adherence to SOP for take-off procedure in terms of checking take-off 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	25
14				System failure affecting the operation of primary instruments / displays or standby instruments	26
15				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
16				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
17				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
18				Pilot tiredness - Inadequate workload distribution	167
19				Flaws in pilot requirements definition process and/or training methodology	168
20				Incorrect use of automation - TOCW System	192
21				Flaws in aircraft system maintenance process definition - TOCW System	204
22				Unintuitive and / or error prone system manual - TOCW	219
23				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System	229
24				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components	230
25				Flaws in manufacturer quality control process - Power supply system components	238
26				Flaws in aircraft system maintenance process definition - Electrical wiring System	252
27				Contaminated wing	12
28				Extreme icing conditions encounter	20
29				System failure affecting the operation of primary instruments / displays or standby instruments	26
30				Flaws in aircraft system maintenance process definition - stickshaker	136
31				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
32				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
33				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - stickshaker system 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
37				Lack of adherence to SOP in terms of awareness on supporting systems warning - 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
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 (condition) monitoring	231
43				Lack of adherence to SOP in terms of de-icing / anti-icing procedures.	232
44				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine	316
45				Navigation deviation	317
46				Flaws in manufacturer quality control process - Autothrottle system in the engine.	324
47				Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.	325
48				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components	333
49				Flaws in aircraft system maintenance process definition - Hydraulic System	334
50				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
51				Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)	410
52				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components	464
53				Flaws in aircraft system maintenance process definition - APU systems and / or components	466
54				Flaws in aircraft system maintenance process definition - Fire detection system components	474
55				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire detection system components	475
56				Flaws in manufacturer quality control process - Fire detection system components	476
57				Flaws in aircraft system maintenance process definition - Fire warning system	477
58				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system	478
59				Flaws in manufacturer quality control process - Fire warning system	479

41				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components	480
42				Flaws in aircraft system maintenance process definition - Fire extinguishing system components	481
43				Flaws in manufacturer quality control process - Fire extinguishing system components	482
44				Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491
45				Inadequate certification process and / or flaws in methodology concerning verification 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				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components	391
49				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components	391
50				Flaws in aircraft system maintenance process definition - Power supply system components	387
51				Flaws in manufacturer quality control process -Hydraulic system components.	386
52				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - other critical flight instruments and systems.	385
53				Flaws in aircraft system maintenance process definition - other critical flight instruments and systems.	383
55				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Drag control system components.	381
56				Flaws in aircraft system maintenance process definition - Drag control system components.	379
57				Flaws in manufacturer quality control process - Drag control system components.	378
58				Flaws in aircraft system maintenance process definition - Landing gear components.	377
59				Flaws in manufacturer quality control process - Landing gear components.	376
60				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Pneumatic system components.	375
61				Flaws in aircraft system maintenance process definition - Pneumatic system components.	374
62				Flaws in manufacturer quality control process - Pneumatic system components.	373
63				Pilot tiredness - Inadequate workload distribution	167
64				Flaws in pilot requirements definition process and/or training methodology	168
65				Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207
66				Poor application of T/O & RTO procedure, failure recognition and preparedness	209
I	Air Traffic related event			Air Traffic related event	
1	1	Take-off instruction error by ATCO	TO02B1111	Inadequate take-off instruction is given by the Air Traffic Control Officer (ATCO) which causes a potential hazardous encounter	
				Convective weather / turbulence / windshear or crosswind conditions during take-off	32
				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	145
1	2	Inadequate communication with pilot	TO02B1112	Ineffective communication between ATCO and flight crew that leads to misunderstanding, and which causes a potential hazardous encounter	
				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
				Pilot tiredness - Inadequate workload distribution	167
				Flaws in pilot requirements definition process and/or training methodology	168
1	3	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	
				Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.	142
				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
1	4	Separation Infringement with Departing Aircraft caused by other a/c	TO02B1121	Aircraft loses separation with an aircraft departing which is caused by the other aircraft	
				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. 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 sufficient separation / clearance	143
				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 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
1	5	Separation Infringement with Landing Aircraft caused by other a/c	TO02B1122	Aircraft loses separation with an aircraft landing which is caused by the other aircraft	
				Emergency landing	8
				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
1	6	Separation Infringement with a/c on missed approach	TO02B1123	Aircraft loses separation with an aircraft performing a missed approach	
				Emergency landing	8
				Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	127
				Traffic controller tiredness - Inadequate workload distribution	137

4				Flaws in traffic controller requirements definition process and/or training methodology	145	
5				Landing without clearance	158	
6				Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	160	
7				Pilot tiredness - Inadequate workload distribution	167	
8				Flaws in pilot requirements definition process and/or training methodology	168	
9				Lack of adherence to Rules of the Air - adherence to Controller clearance	296	
1	7	Separation Infringement with departing a/c caused by aircraft taking off	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	140
2				Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airtaxi or / and aircraft / vehicle proximity	144	
3				Takeoff without clearance	157	
4				Pilot tiredness - Inadequate workload distribution	167	
5				Flaws in pilot requirements definition process and/or training methodology	168	
6				Lack of adherence to Rules of the Air - adherence to Controller clearance	296	
1	8	Separation Infringement with landing a/c caused by aircraft taking off	TO02B11215	Aircraft loses separation with an aircraft landing 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	140
2				Takeoff without clearance	157	
3				Pilot tiredness - Inadequate workload distribution	167	
4				Flaws in pilot requirements definition process and/or training methodology	168	
5				Lack of adherence to Rules of the Air - adherence to Controller clearance	296	
1	9	Illegal A/C infringement	TO02B11216	Aircraft deliberately infringes separation disregarding the instruction from ATC	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 Rules of the Air - adherence to Controller clearance	296	
1	10	Traffic density too high	TO02B1122	Traffic density above the airport is too high to allow the departing aircraft to take-off	Flaws in Airspace and Air Traffic planning procedures design process	323
2				Flaws in airport capacity management process	400	
1	11	Aircraft not ready to take-off	TO02B1123	Flight crew are still preparing the aircraft for take-off when clearance is given resulting in the aircraft missing the allotted 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	264	
5				Lack of adherence to SOP for take-off procedure in terms of time limitation for take-off preparation.	404	
1	12	Animals in vicinity of runway	TO02B1124	The presence of animal in the runway area and which may cause a collision hazard	Wildlife incursion	5
2				Bird strike	34	
3				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162	
4				Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401	
1	13	Weather Related Problem	TO02B1125	ATC advise the flight crew that the weather is unsuitable for take-off	Convective weather / turbulence / windshear or crosswind conditions during take-off	32
1	14	Effective Hazard Avoidance	TO02B12	ATC instructs aircraft to stop during take-off roll	Risk of dangerous occurrences appeared during take-off roll	85
II + I		Flight Crew rejects take-off			Flight Crew rejects take-off	
1	15	Pilot Misdiagnosis	TO02B211	The pilot fails to understand the air traffic situation and as a result 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				Late rejected takeoff decision / initiation	368	
4				Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations	384	
5				Wildlife incursion	5	
6				Emergency landing	8	
7				Convective weather / turbulence / windshear or crosswind conditions during take-off	32	
8				Bird strike	34	
9				Risk of dangerous occurrences appeared during take-off roll	85	
10				Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	127	
11				Lack of English proficiency	132	
12				Incorrect or confusing / misleading ATC instructions	133	
13				Use of non-standard phraseology by pilot and/or controller	134	
14				Traffic controller tiredness - inadequate workload distribution	137	
15				Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	139	
16				Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications	140	
17				Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airtaxi and airport topology.	142	
18				Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	143	
19				Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airtaxi or / and aircraft / vehicle proximity	144	
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				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151	
24				Takeoff without clearance	157	
25				Landing without clearance	158	
26				Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	160	
27				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162	
28				Pilot tiredness - Inadequate workload distribution	167	
29				Flaws in pilot requirements definition process and/or training methodology	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	400	

35				Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401
36				Lack of adherence to SOP for take-off procedure in terms of time limitation for take-off preparation.	404
37				Taxiing without clearance	367
1	16 Pilot Misjudgement	TO02B212	The pilot diagnoses the air traffic situation but misjudges the 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
7				Convective weather / turbulence / windshear or crosswind conditions during take-off	32
8				Bird strike	34
9				Risk of dangerous occurrences appeared during take-off roll	85
10				Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	127
11				Lack of English proficiency	132
12				Incorrect or confusing / misleading ATC instructions	133
13				Use of non-standard phraseology by pilot and/or controller	134
14				Traffic controller tiredness - Inadequate workload distribution	137
15				Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	139
16				Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications	140
17				Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.	142
18				Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	143
19				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
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				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
24				Takeoff without clearance	157
25				Landing without clearance	158
26				Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	160
27				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162
28				Pilot tiredness - Inadequate workload distribution	167
29				Flaws in pilot requirements definition process and/or training methodology	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	400
35				Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401
36				Lack of adherence to SOP for take-off procedure in terms of time limitation for take-off preparation.	404
37				Taxiing without clearance	367
1	17 Take-off rejected correctly when below V1	TO02B22	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.	not identifiable at that level	
2				Wildlife incursion	5
3				Emergency landing	8
4				Convective weather / turbulence / windshear or crosswind conditions during take-off	32
5				Bird strike	34
6				Risk of dangerous occurrences appeared during take-off roll	85
7				Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	127
8				Lack of English proficiency	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	137
12				Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	139
13				Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications	140
14				Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.	142
15				Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	143
16				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
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 driver	148
20				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
21				Takeoff without clearance	157
22				Landing without clearance	158
23				Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	160
24				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162
25				Pilot tiredness - Inadequate workload distribution	167
26				Flaws in pilot requirements definition process and/or training methodology	168

27				Flaws in CRM training procedures	263
28				Lack of adherence to the main CRM rules	264
29				Lack of adherence to Rules of the Air - adherence to Controller clearance	296
30				Flaws in Airspace and Air Traffic planning procedures design process	323
31				Flaws in airport capacity management process	400
32				Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401
33				Lack of adherence to SOP for take-off procedure in terms of time limitation for take-off preparation.	404
34				Taxiing without clearance	367
III + II + I	III	Failure to achieve maximum braking		Failure to achieve maximum braking	
1	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.	
2				Convective weather - heavy rain resulted with wet RWY surface	75
3				Pilot tiredness - Inadequate workload distribution	167
4				Flaws in pilot requirements definition process and/or training methodology	168
5				Gross error in takeoff weight entry and/or in V1 / VR speeds assessment	179
6				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
7				High energy RTO rate is an indicator of improper Operator's policy for T/O operations.	211
8				Poor application of T/O & RTO procedure, computation of T/O parameters	260
9				Wildlife incursion	5
10				Emergency landing	8
11				Convective weather / turbulence / windshear or crosswind conditions during take-off	32
12				Bird strike	34
13				Risk of dangerous occurrences appeared during take-off roll	85
14				Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	127
15				Lack of English proficiency	132
16				Incorrect or confusing / misleading ATC instructions	133
17				Use of non-standard phraseology by pilot and/or controller	134
18				Traffic controller tiredness - Inadequate workload distribution	137
19				Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	139
20				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. Lack of awareness of own position on the airsite and airport topology.	142
22				Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	143
23				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
24				Flaws in traffic controller requirements definition process and/or training methodology	145
25				Lack of or poor communication quality	146
26				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 or / and passive contribution to the PF duties	151
28				Takeoff without clearance	157
29				Landing without clearance	158
30				Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	160
31				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162
32				Pilot tiredness - Inadequate workload distribution	167
33				Flaws in pilot requirements definition process and/or training methodology	168
34				Flaws in CRM training procedures	263
35				Lack of adherence to the main CRM rules	264
36				Lack of adherence to Rules of the Air - adherence to Controller clearance	296
37				Flaws in Airspace and Air Traffic planning procedures design process	323
38				Flaws in airport capacity management process	400
39				Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401
40				Lack of adherence to SOP for take-off procedure in terms of time limitation for take-off preparation.	404
41				Taxiing without clearance	367
42				Pilot tiredness - Inadequate workload distribution	167
43				Flaws in pilot requirements definition process and/or training methodology	168
44				Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207
45				Late rejected takeoff decision / initiation	368
1	19	Brakes not functioning correctly	TO02B32	Brakes are not giving maximum braking, i.e. because of improper maintenance and damages	
2				System failure affecting aircraft configuration, controllability and/or flying qualities	25
3				Contaminated Runway	39
4				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
5				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
6				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216
7				Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake).	366
8				Wildlife incursion	5
9				Emergency landing	8
10				Convective weather / turbulence / windshear or crosswind conditions during take-off	32
11				Bird strike	34
12				Risk of dangerous occurrences appeared during take-off roll	85
				Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	127

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				Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	139
18				Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications	140
19				Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.	142
20				Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	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
22				Flaws in traffic controller requirements definition process and/or training 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				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 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
29				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162
30				Pilot tiredness - Inadequate workload distribution	167
31				Flaws in pilot requirements definition process and/or training methodology	168
32				Flaws in CRM training procedures	263
33				Lack of adherence to the main CRM rules	264
34				Lack of adherence to Rules of the Air - adherence to Controller clearance	296
35				Flaws in Airspace and Air Traffic planning procedures design process	323
36				Flaws in airport capacity management process	400
37				Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence 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
42				Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207
43				Late rejected takeoff decision / initiation	368
44				Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations	384
1	20	Brakes not applied correctly	TO02B33	Failure of the flight crew to apply all the braking systems immediately after take-off rejection.	
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, braking initiation sequence	199
5				Wildlife incursion	5
6				Emergency landing	8
7				Convective weather / turbulence / windshear or crosswind conditions during take-off	32
8				Bird strike	34
9				Risk of dangerous occurrences appeared during take-off roll	85
10				Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	127
11				Lack of English proficiency	132
12				Incorrect or confusing / misleading ATC instructions	133
13				Use of non-standard phraseology by pilot and/or controller	134
14				Traffic controller tiredness - Inadequate workload distribution	137
15				Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	139
16				Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications	140
17				Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.	142
18				Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	143
19				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
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				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
24				Takeoff without clearance	157
25				Landing without clearance	158
26				Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	160
27				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162
28				Pilot tiredness - Inadequate workload distribution	167
29				Flaws in pilot requirements definition process and/or training methodology	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	400
35				Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401
36				Lack of adherence to SOP for take-off procedure in terms of time limitation for take-off preparation.	404
37				Taxiing without clearance	367
38				Pilot tiredness - Inadequate workload distribution	167
39				Flaws in pilot requirements definition process and/or training methodology	168

39				Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207
40				Late rejected takeoff decision / initiation	368
41				Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations	384
I	Inappropriate handling by flight crew			Inappropriate handling by flight crew	
1	1 Unsuccessful handling due to lack of training	TO03B111	Untrained pilot flying (PF) handling take-offs with one engine inoperative on four engine aircraft.	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
1	2 Unsuccessful Handling	TO03B112	The pilot flying (PF) applies inappropriate handling that affects the directional stability of the aircraft during the take-off roll.	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 AFM limitations for Take-off	202
5				Failure to remember / assess crosswind component limit for prevailing runway condition	418
1	3 Adverse Weather Conditions	TO03B12	The prevailing weather conditions affect the directional stability of the aircraft during the take-off roll. The weather conditions that can cause this failure including strong winds and slippery runway conditions.	Convective weather / turbulence / windshear or crosswind conditions during take-off	32
2				Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate	45
3				Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling	200
4				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
II + I	II Take-off Rejection			Take-off Rejection	
1	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.	Pilot tiredness - Inadequate workload distribution	167
2				Flaws in pilot requirements definition process and/or training methodology	168
3				Late rejected takeoff decision / initiation	368
4				Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations	384
5				Convective weather / turbulence / windshear or crosswind conditions during take-off	32
6				Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate	45
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				Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling	200
11				Lack of adherence to AFM limitations for Take-off	202
12				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
13				Failure to remember / assess crosswind component limit for prevailing runway condition	418
1	5 Pilot Misjudgement	TO03B212	The pilot diagnoses the correct aircraft system failure but 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				Late rejected takeoff decision / initiation	368
5				Convective weather / turbulence / windshear or crosswind conditions during take-off	32
6				Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate	45
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				Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling	200
11				Lack of adherence to AFM limitations for Take-off	202
12				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
13				Failure to remember / assess crosswind component limit for prevailing runway condition	418
1	6 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.	not identifiable at that level	
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
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				Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling	200
8				Lack of adherence to AFM limitations for Take-off	202
9				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
10				Failure to remember / assess crosswind component limit for prevailing runway condition	418
III + II	III Failure to maintain control (V <= V1)			Failure to maintain control (V <= V1)	
I	7 Uncontrollable	TO03B31	No input to controls will allow the pilot to maintain control of the aircraft with speed less than V1	not identifiable at that level	

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
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				Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling	200
8				Lack of adherence to AFM limitations for Take-off	202
9				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
10				Failure to remember / assess crosswind component limit for prevailing runway condition	418
11				Pilot tiredness - Inadequate workload distribution	167
12				Flaws in pilot requirements definition process and/or training methodology	168
13				Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207
14				Late rejected takeoff decision / initiation	368
15				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				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
5				Adverse weather in terms of heavy rain or icing conditions resulted with decreased 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	202
11				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
12				Failure to remember / assess crosswind component limit for prevailing runway condition	418
13				Pilot tiredness - Inadequate workload distribution	167
14				Flaws in pilot requirements definition process and/or training methodology	168
15				Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207
16				Late rejected takeoff decision / initiation	368
17				Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations	384
1	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	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
5				Adverse weather in terms of heavy rain or icing conditions resulted with decreased 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	202
11				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
12				Failure to remember / assess crosswind component limit for prevailing runway condition	418
13				Pilot tiredness - Inadequate workload distribution	167
14				Flaws in pilot requirements definition process and/or training methodology	168
15				Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207
16				Late rejected takeoff decision / initiation	368
17				Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations	384
1	10 Insufficient control	TO03B34	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
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
5				Adverse weather in terms of heavy rain or icing conditions resulted with decreased 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	202
11				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
12				Failure to remember / assess crosswind component limit for prevailing runway condition	418
13				Pilot tiredness - Inadequate workload distribution	167
14				Flaws in pilot requirements definition process and/or training methodology	168

15				Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP 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 + III + II + I	IV	Failure to Achieve Maximum Braking		Failure to Achieve Maximum Braking	
1	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.	
2				Convective weather - heavy rain resulted with wet RWY surface	75
3				Pilot tiredness - Inadequate workload distribution	167
4				Flaws in pilot requirements definition process and/or training methodology	168
5				Gross error in takeoff weight entry and/or in V1 / VR speeds assessment	179
6				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
7				High energy RTO rate is an indicator of improper Operator's policy for T/O operations.	211
8				Poor application of T/O & RTO procedure, computation of T/O parameters	260
9				Convective weather / turbulence / windshear or crosswind conditions during take-off	32
10				Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate	45
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				Pilot tiredness - Inadequate workload distribution	167
13				Flaws in pilot requirements definition process and/or training methodology	168
14				Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling	200
15				Lack of adherence to AFM limitations for Take-off	202
16				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
17				Failure to remember / assess crosswind component limit for prevailing runway condition	418
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, adherence to SOP, criteria for STOP decision	207
21				Late rejected takeoff decision / initiation	368
22				Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations	384
23				Pilot tiredness - Inadequate workload distribution	167
24				Flaws in pilot requirements definition process and/or training methodology	168
1	12	Brakes not functioning correctly	TO03B42	Brakes are not giving maximum braking, i.e. because of improper maintenance and damages	
2				Poor application of T/O & RTO procedure, aircraft handling	388
3				System failure affecting aircraft configuration, controllability and/or flying qualities	25
4				Contaminated Runway	39
5				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
6				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
7				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216
8				Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake).	366
9				Convective weather / turbulence / windshear or crosswind conditions during take-off	32
10				Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate	45
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				Pilot tiredness - Inadequate workload distribution	167
13				Flaws in pilot requirements definition process and/or training methodology	168
14				Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling	200
15				Lack of adherence to AFM limitations for Take-off	202
16				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
17				Failure to remember / assess crosswind component limit for prevailing runway condition	418
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, adherence to SOP, criteria for STOP decision	207
21				Late rejected takeoff decision / initiation	368
22				Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations	384
23				Pilot tiredness - Inadequate workload distribution	167
1	13	Brakes not applied correctly	TO03B43	Failure of the flight crew to apply all the braking systems immediately after take-off rejection.	
2				Poor application of T/O & RTO procedure, aircraft handling	388
3				Pilot tiredness - Inadequate workload distribution	167
4				Flaws in pilot requirements definition process and/or training methodology	168
5				Poor application of T/O & RTO procedure, braking initiation sequence	199
6				Convective weather / turbulence / windshear or crosswind conditions during take-off	32
7				Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate	45
8				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
9				Pilot tiredness - Inadequate workload distribution	167
10				Flaws in pilot requirements definition process and/or training methodology	168
11				Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling	200
12				Lack of adherence to AFM limitations for Take-off	202

11				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
12				Failure to remember / assess crosswind component limit for prevailing runway condition	418
13				Pilot tiredness - Inadequate workload distribution	167
14				Flaws in pilot requirements definition process and/or training methodology	168
15				Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207
16				Late rejected takeoff decision / initiation	368
17				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
V+					
I	V	Failure to maintain control		Failure to maintain control	
1	14	Uncontrollable	TO03B51	No input to controls will allow the pilot to maintain control of the aircraft when take-off continued	not identifiable at the moment
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
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				Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling	200
8				Lack of adherence to AFM limitations for Take-off	202
9				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
10				Failure to remember / assess crosswind component limit for prevailing runway condition	418
1	15	Lack of control	TO03B52	The pilot makes no attempt to control the aircraft when take-off continued	Pilot tiredness - Inadequate workload distribution
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
5				Adverse weather in terms of heavy rain or icing conditions resulted with decreased 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	202
11				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
12				Failure to remember / assess crosswind component limit for prevailing runway condition	418
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
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
5				Adverse weather in terms of heavy rain or icing conditions resulted with decreased 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	202
11				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
12				Failure to remember / assess crosswind component limit for prevailing runway condition	418
1	17	Insufficient control	TO03B54	The pilot applies correct measures but are not enough to prevent aircraft leaving off the side of the runway	Pilot tiredness - Inadequate workload distribution
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
5				Adverse weather in terms of heavy rain or icing conditions resulted with decreased 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	202
11				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
12				Failure to remember / assess crosswind component limit for prevailing runway condition	418
I		Directional control systems failure		Directional control systems failure	
1	1	Main Gear Failure	TO04B111	Failure of any part of the main gear	System failure affecting aircraft configuration, controllability and/or flying qualities
2				Tire burst	80

3				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149	
4				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150	
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	
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	
4				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150	
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	
1	3	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 directional instability	System failure affecting aircraft configuration, controllability and/or flying qualities	25
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				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	
5				Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing 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	
3				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149	
4				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150	
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	
1	5	Wheel Sub-Assembly Failure	TO04B123	Failure of any part of the wheel excluding tyre or braking system, i.e. an axle failure or wheel rim failure	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	
4				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150	
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	
II + I	II	Take-off rejection			Take-off rejection	
1	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.	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, failure recognition and preparedness	209	
4				System failure affecting aircraft configuration, controllability and/or flying qualities	25	
5				Tire burst	80	
6				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149	
7				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150	
8				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	
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.	376	
12				Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing 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	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.	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	
6				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149	
7				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150	
8				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	

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.	376
12				Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing 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	Take-off rejected correctly when below 8 V1	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.	not identifiable at that level	
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
5				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
6				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
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
10				Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake).	366
11				Flaws in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake).	365
III + II + I	Failure to maintain control (take-off rejected)			Failure to maintain control (take-off rejected)	
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
5				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
6				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
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
10				Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake).	366
11				Flaws in manufacturer quality control process - marshalling/rolling/taxiing control 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
14				Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP 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
2				Flaws in pilot requirements definition process and/or training methodology	168
3				Poor application of T/O & RTO procedure, aircraft handling	388
4				System failure affecting aircraft configuration, controllability and/or flying qualities	25
5				Tire burst	80
6				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
7				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
8				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
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.	376
12				Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing 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
14				Pilot tiredness - Inadequate workload distribution	167
15				Flaws in pilot requirements definition process and/or training methodology	168
16				Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207
17				Poor application of T/O & RTO procedure, failure recognition and preparedness	209
1	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	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				System failure affecting aircraft configuration, controllability and/or flying qualities	25
5				Tire burst	80
6				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
7				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150

8				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
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.	376
12				Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing 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
14				Pilot tiredness - Inadequate workload distribution	167
15				Flaws in pilot requirements definition process and/or training methodology	168
16				Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207
17				Poor application of T/O & RTO procedure, failure recognition and preparedness	209
1	12	Insufficient control	TO04B34	The pilot applies correct measures but are not enough to prevent aircraft leaving off the side of the runway	
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, aircraft handling	388
5				System failure affecting aircraft configuration, controllability and/or flying qualities	25
6				Tire burst	80
7				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
8				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
9				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
10				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
11				Flaws in aircraft system maintenance process definition - Landing gear components.	377
12				Flaws in manufacturer quality control process - Landing gear components.	376
13				Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake).	366
14				Flaws in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake).	365
15				Pilot tiredness - Inadequate workload distribution	167
16				Flaws in pilot requirements definition process and/or training methodology	168
17				Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207
18				Poor application of T/O & RTO procedure, failure recognition and preparedness	209
IV + III + II + I		Failure to Achieve Maximum Braking (V<V1)		Failure to Achieve Maximum Braking (V<V1)	
1	13	Insufficient Runway Length	TO04B41	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.	
2				Convective weather - heavy rain resulted with wet RWY surface	75
3				Pilot tiredness - Inadequate workload distribution	167
4				Flaws in pilot requirements definition process and/or training methodology	168
5				Gross error in takeoff weight entry and/or in V1 / VR speeds assessment	179
6				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
7				High energy RTO rate is an indicator of improper Operator's policy for T/O operations.	211
8				Poor application of T/O & RTO procedure, computation of T/O parameters	260
9				System failure affecting aircraft configuration, controllability and/or flying qualities	25
10				Tire burst	80
11				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
12				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
13				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
14				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
15				Flaws in aircraft system maintenance process definition - Landing gear components.	377
16				Flaws in manufacturer quality control process - Landing gear components.	376
17				Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake).	366
18				Flaws in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake).	365
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
23				Pilot tiredness - Inadequate workload distribution	167
24				Flaws in pilot requirements definition process and/or training methodology	168
1	14	Brakes not functioning correctly	TO04B42	Brakes are not giving maximum braking, e.g. because of improper maintenance and damages	
2				System failure affecting aircraft configuration, controllability and/or flying qualities	25
3				Contaminated Runway	39
4				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
5				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
6				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216

6				Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake).	366
7				System failure affecting aircraft configuration, controllability and/or flying qualities	25
8				Tire burst	80
9				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
10				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
11				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
12				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
13				Flaws in aircraft system maintenance process definition - Landing gear components.	377
14				Flaws in manufacturer quality control process - Landing gear components.	376
15				Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake).	366
16				Flaws in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake).	365
17				Pilot tiredness - Inadequate workload distribution	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				Poor application of T/O & RTO procedure, failure recognition and preparedness	209
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
1	15	Brakes not applied correctly	TO04B43	Failure of the flight crew to apply all the braking systems immediately after take-off rejection.	
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, braking initiation sequence	199
5				System failure affecting aircraft configuration, controllability and/or flying qualities	25
6				Tire burst	80
7				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
8				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
9				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
10				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
11				Flaws in aircraft system maintenance process definition - Landing gear components.	377
12				Flaws in manufacturer quality control process - Landing gear components.	376
13				Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake).	366
14				Flaws in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake).	365
15				Pilot tiredness - Inadequate workload distribution	167
16				Flaws in pilot requirements definition process and/or training methodology	168
17				Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207
18				Poor application of T/O & RTO procedure, failure recognition and preparedness	209
19				Pilot tiredness - Inadequate workload distribution	167
20				Flaws in pilot requirements definition process and/or training methodology	168
V + I V		Failure to Maintain control (take-off continued)		Failure to Maintain control (take-off continued)	
1	16	Uncontrollable	TO04B51	No input to controls will allow the pilot to maintain control of the aircraft.	
2				not identifiable at that level	
3				System failure affecting aircraft configuration, controllability and/or flying qualities	25
4				Tire burst	80
5				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
6				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
7				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
8				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
9				Flaws in aircraft system maintenance process definition - Landing gear components.	377
10				Flaws in manufacturer quality control process - Landing gear components.	376
11				Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake).	366
1	17	Lack of Control	TO04B52	The pilot makes no attempt to control the aircraft.	
2				Flaws in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake).	365
3				Pilot tiredness - Inadequate workload distribution	167
4				Flaws in pilot requirements definition process and/or training methodology	168
5				Poor application of T/O & RTO procedure, aircraft handling	388
6				System failure affecting aircraft configuration, controllability and/or flying qualities	25
7				Tire burst	80
8				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
9				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
10				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
11				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

12				Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing 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	18	Incorrect Control	TO04B53	The pilot applies incorrect control to the aircraft. This can be due to improper training, stress and fatigue	
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, aircraft handling	388
5				System failure affecting aircraft configuration, controllability and/or flying qualities	25
6				Tire burst	80
7				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
8				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
9				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
10				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
11				Flaws in aircraft system maintenance process definition - Landing gear components.	377
12				Flaws in manufacturer quality control process - Landing gear components.	376
13				Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake).	366
1	19	Insufficient Control	TO04B54	The pilot applies correct measures but are not enough to prevent aircraft leaving off the side of the runway	
2				Flaws in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake).	365
3				Pilot tiredness - Inadequate workload distribution	167
4				Flaws in pilot requirements definition process and/or training methodology	168
5				Poor application of T/O & RTO procedure, aircraft handling	388
6				System failure affecting aircraft configuration, controllability and/or flying qualities	25
7				Tire burst	80
8				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
9				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
10				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
11				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
12				Flaws in aircraft system maintenance process definition - Landing gear components.	377
13				Flaws in manufacturer quality control process - Landing gear components.	376
I		Incorrect configuration		Incorrect configuration	
1	1	Unsuccessful TO configuration checklist	TO05B111	Co-pilot fails to determine the position of the flap and slats required for a successful take-off	
2				Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake).	366
3				Flaws in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake).	365
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 take-off procedure in terms of determining of aircraft configuration.	198
7				Incorrect stab-trim setting	258
8				Undetected incorrect takeoff configuration	259
1	2	Unsuccessful Checklist Verification	TO05B112	Captain fails to identify the incorrect position of the flap and slats determined by co-pilot	
2				Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake).	366
3				Flaws in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake).	365
4				Pilot tiredness - Inadequate workload distribution	167
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				Flaws in pilot requirements definition process and/or training methodology	168
1	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 the stand	
2				Unintuitive and / or error prone system manual - FMC	217
3				Pilot tiredness - Inadequate workload distribution	167
4				Flaws in pilot requirements definition process and/or training methodology	168
1	4	Verification not conducted	TO05B21	Captain fails to perform the take-off configuration check prior to the application of take-off power	
2				Pilot tiredness - Inadequate workload distribution	167
3				Flaws in pilot requirements definition process and/or training methodology	168
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				Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201
1	5	Verification unsuccessful	TO05B22	Captain performs the take-off configuration check but fails to notice that the aircraft is configured incorrectly.	
2				Pilot tiredness - Inadequate workload distribution	167
3				Flaws in pilot requirements definition process and/or training methodology	168
II		Take-off configuration warning		Take-off configuration warning	
1	6	Unsuccessful Manufacture	TO05B311	TOCW system fails due to unsuccessful manufacture and hence the take-off is not rejected	
2				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System	229
3				Flaws in manufacturer quality control process - TOCW system components	222
4				System failure affecting aircraft configuration, controllability and/or flying qualities	25
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 - ground radar.	164
7				Unintuitive and / or error prone system manual - FMC	217
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
10				Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201
11				Incorrect stab-trim setting	258
1	7	Unsuccessful Maintenance	TO05B312	TOCW system fails due to unsuccessful maintenance and hence the take-off is not rejected	
2				Undetected incorrect takeoff configuration	259
3				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
4				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
5				Flaws in aircraft system maintenance process definition - TOCW System	204
6				System failure affecting aircraft configuration, controllability and/or flying qualities	25

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
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
10				Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201
11				Incorrect stab-trim setting	258
12				Undetected incorrect takeoff configuration	259
1	8	Unsuccessful Operation	TO05B313	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 circuit breaker following testing	
2				Incorrect use of automation - TOCW System	192
3				Pilot tiredness - Inadequate workload distribution	167
4				Flaws in pilot requirements definition process and/or training methodology	168
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 - TOCW	219
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				Unintuitive and / or error prone system manual - FMC	217
9				Pilot tiredness - Inadequate workload distribution	167
10				Flaws in pilot requirements definition process and/or training methodology	168
11				Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.	198
12				Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201
13				Incorrect stab-trim setting	258
1	9	Unsuccessful Manufacture	TO05B321	TOCW power supply fails due to unsuccessful manufacture and hence the take-off is not rejected	
2				Flaws in manufacturer quality control process - Power supply system components	238
3				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components	230
4				System failure affecting the operation of primary instruments / displays or standby instruments	26
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
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
10				Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201
11				Incorrect stab-trim setting	258
12				Undetected incorrect takeoff configuration	259
1	10	Unsuccessful Maintenance	TO05B322	TOCW power supply fails due to unsuccessful maintenance and hence the take-off is not rejected	
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				Flaws in aircraft system maintenance process definition - Electrical wiring System	252
5				System failure affecting the operation of primary instruments / displays or standby instruments	26
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				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
11				Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201
12				Incorrect stab-trim setting	258
1	11	Aircraft takes-off with incorrect configuration	TO05B33	Aircraft is still able to take-off even with the incorrect configuration	
2				not identifiable at the moment	
3				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
4				Unintuitive and / or error prone system manual - FMC	217
5				Pilot tiredness - Inadequate workload distribution	167
6				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 configuration.	198
8				Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201
9				Incorrect stab-trim setting	258
10				Undetected incorrect takeoff configuration	259
III+	III	Flight crew rejects take-off		Flight crew rejects take-off	
1	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	
2				Cautions / warnings (genuine or spurious) that may lead to a low-speed or high-speed rejected take-off	46
3				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
4				Pilot tiredness - Inadequate workload distribution	167
5				Flaws in pilot requirements definition process and/or training methodology	168
6				Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207
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				Unintuitive and / or error prone system manual - FMC	217
9				Pilot tiredness - Inadequate workload distribution	167
10				Flaws in pilot requirements definition process and/or training methodology	168
11				Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.	198

11				Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201
12				Incorrect stab-trim setting	258
13				Undetected incorrect takeoff configuration	259
1	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-off	
2				Cautions / warnings (genuine or spurious) that may lead to a low-speed or high-speed rejected take-off	46
3				Pilot tiredness - Inadequate workload distribution	167
4				Flaws in pilot requirements definition process and/or training methodology	168
5				Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207
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				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
11				Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201
12				Incorrect stab-trim setting	258
13				Undetected incorrect takeoff configuration	259
1	14	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 probability.	
2				not identifiable at the moment	
3				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
4				Unintuitive and / or error prone system manual - FMC	217
5				Pilot tiredness - Inadequate workload distribution	167
6				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 configuration.	198
8				Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201
9				Incorrect stab-trim setting	258
10				Undetected incorrect takeoff configuration	259
IV+ III+ I	IV	Failure to achieve maximum braking		Failure to achieve maximum braking	
1	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.	
2				Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate	45
3				Pilot tiredness - Inadequate workload distribution	167
4				Flaws in pilot requirements definition process and/or training methodology	168
5				Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling	200
6				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
7				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
8				High energy RTO rate is an indicator of improper Operator's policy for T/O operations.	211
9				Gross error in takeoff weight entry and/or in V1 / VR speeds assessment	179
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				Unintuitive and / or error prone system manual - FMC	217
12				Pilot tiredness - Inadequate workload distribution	167
13				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 configuration.	198
15				Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201
16				Incorrect stab-trim setting	258
17				Undetected incorrect takeoff configuration	259
18				Cautions / warnings (genuine or spurious) that may lead to a low-speed or high-speed rejected take-off	46
19				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
20				Pilot tiredness - Inadequate workload distribution	167
21				Flaws in pilot requirements definition process and/or training methodology	168
1	16	Brakes not functioning correctly	TO05B52	Brakes are not giving maximum braking, e.g. because of improper maintenance and damages	
2				System failure affecting aircraft configuration, controllability and/or flying qualities	25
3				Pilot tiredness - Inadequate workload distribution	167
4				Flaws in pilot requirements definition process and/or training methodology	168
5				Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake).	366
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				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
11				Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201
12				Incorrect stab-trim setting	258
13				Undetected incorrect takeoff configuration	259
14				Cautions / warnings (genuine or spurious) that may lead to a low-speed or high-speed rejected take-off	46
15				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
16				Pilot tiredness - Inadequate workload distribution	167
17				Flaws in pilot requirements definition process and/or training methodology	168

17				Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207
1	17	Brakes not applied correctly	TO05853	Failure of the flight crew to apply all the braking systems immediately after take-off rejection.	
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, braking initiation sequence	199
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
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
10				Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201
11				Incorrect stab-trim setting	258
12				Undetected incorrect takeoff configuration	259
13				Cautions / warnings (genuine or spurious) that may lead to a low-speed or high-speed rejected take-off	46
14				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 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
V+1				Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207
11 V		Aircraft stalls after rotation		Aircraft stalls after rotation	
1	18	Stall Unavoidable	TO05861	No input to controls will allow the flight crew to avoid the stall	
2				not identifiable at that level	
3				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
4				Unintuitive and / or error prone system manual - FMC	217
5				Pilot tiredness - Inadequate workload distribution	167
6				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 configuration.	198
8				Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201
9				Incorrect stab-trim setting	258
10				Undetected incorrect takeoff configuration	259
11				System failure affecting aircraft configuration, controllability and/or flying qualities	25
12				System failure affecting the operation of primary instruments / displays or standby instruments	26
13				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
14				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
15				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
16				Pilot tiredness - Inadequate workload distribution	167
17				Flaws in pilot requirements definition process and/or training methodology	168
18				Incorrect use of automation - TOCW System	192
19				Flaws in aircraft system maintenance process definition - TOCW System	204
20				Unintuitive and / or error prone system manual - TOCW	219
21				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System	229
22				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components	230
23				Flaws in manufacturer quality control process - Power supply system components	238
1	19	Pilot ignores stickshaker	TO058622	Flight crew take no action to the activated stick-shaker	
2				Lack of adherence to SOP in terms of awareness on supporting systems warning - stickshaker	197
3				Pilot tiredness - Inadequate workload distribution	167
4				Flaws in pilot requirements definition process and/or training methodology	168
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
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
10				Lack of adherence to SOP for take-off procedure in terms of checking take-off 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	25
14				System failure affecting the operation of primary instruments / displays or standby instruments	26
15				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
16				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
17				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
18				Pilot tiredness - Inadequate workload distribution	167
19				Flaws in pilot requirements definition process and/or training methodology	168
20				Incorrect use of automation - TOCW System	192
21				Flaws in aircraft system maintenance process definition - TOCW System	204
22				Unintuitive and / or error prone system manual - TOCW	219
23				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System	229
24				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components	230
25				Flaws in manufacturer quality control process - Power supply system components	238
				Flaws in aircraft system maintenance process definition - Electrical wiring System	252

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	26
2					Flaws in aircraft system maintenance process definition - stickshaker	136
3					Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
4					Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
5					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - stickshaker system components	161
6					Flaws in manufacturer quality control process - Stickshaker system components	266
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					Unintuitive and / or error prone system manual - FMC	217
9					Pilot tiredness - Inadequate workload distribution	167
10					Flaws in pilot requirements definition process and/or training methodology	168
11					Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.	198
12					Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201
13					Incorrect stab-trim setting	258
14					Undetected incorrect takeoff configuration	259
15					System failure affecting aircraft configuration, controllability and/or flying qualities	25
16					System failure affecting the operation of primary instruments / displays or standby instruments	26
17					Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
18					Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
19					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
20					Pilot tiredness - Inadequate workload distribution	167
21					Flaws in pilot requirements definition process and/or training methodology	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	219
25					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System	229
26					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components	230
27					Flaws in manufacturer quality control process - Power supply system components	238
28					Flaws in aircraft system maintenance process definition - Electrical wiring System	252
1	21	Stall AOA too low	TO05B6212	Stall occurs at an AOA that is less than the AOA required to activate the stick-shaker	Contaminated wing	12
2					Extreme icing conditions encounter	20
3					System failure affecting the operation of primary instruments / displays or standby instruments	26
4					Inadequate aircraft de-icing / anti-icing	180
5					Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing	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
8					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - anti-ice 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.	232
12					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
13					Unintuitive and / or error prone system manual - FMC	217
14					Pilot tiredness - Inadequate workload distribution	167
15					Flaws in pilot requirements definition process and/or training methodology	168
16					Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.	198
17					Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201
18					Incorrect stab-trim setting	258
19					Undetected incorrect takeoff configuration	259
20					System failure affecting aircraft configuration, controllability and/or flying qualities	25
21					System failure affecting the operation of primary instruments / displays or standby instruments	26
22					Flaws in maintenance technician / airworthiness specialist requirements definition 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 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
27					Incorrect use of automation - TOCW System	192
28					Flaws in aircraft system maintenance process definition - TOCW System	204
29					Unintuitive and / or error prone system manual - TOCW	219
30					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System	229
31					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components	230
32					Flaws in manufacturer quality control process - Power supply system components	238
33					Flaws in aircraft system maintenance process definition - Electrical wiring System	252
VI+ H+II +V VI						
1	22	Uncontrollable	TO05B71	No input to controls will allow the flight crew to maintain control of the aircraft.	Flight crew fails to regain control	
2					not identifiable at that level	
					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 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	168	
6				Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.	198	
7				Lack of adherence to SOP for take-off procedure in terms of checking take-off 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	
11				System failure affecting the operation of primary instruments / displays or standby instruments	26	
12				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149	
13				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150	
14				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 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				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System	229	
21				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system 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	
24				Contaminated wing	12	
25				Extreme icing conditions encounter	20	
26				System failure affecting the operation of primary instruments / displays or standby instruments	26	
27				Flaws in aircraft system maintenance process definition - stickshaker	136	
28				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149	
29				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150	
30				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - stickshaker system components	161	
31				Pilot tiredness - Inadequate workload distribution	167	
32				Flaws in pilot requirements definition process and/or training methodology	168	
33				Inadequate aircraft de-icing / anti-icing	180	
34				Lack of adherence to SOP in terms of awareness on supporting systems warning - stickshaker	197	
35				Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing	208	
36				Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.	210	
37				Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT)	212	
38				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - antice fluid HOT	213	
39				Applied de-icing / anti-icing method is not sufficient for predicted conditions	228	
40				Lack of adherence to SOP in terms of aircraft icing monitoring	231	
41				Lack of adherence to SOP in terms of de-icing / anti-icing procedures.	232	
1	23	Lack of control	TO05B72	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 AFM in terms of emergency procedures - stall recovery	292
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					Unintuitive and / or error prone system manual - FMC	217
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 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 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
13					System failure affecting the operation of primary instruments / displays or standby instruments	26
14					Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
15					Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
16					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					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 of the system / product compliance with requirements - TOCW System	229
23					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system 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
26					Contaminated wing	12
27					Extreme icing conditions encounter	20
28					System failure affecting the operation of primary instruments / displays or standby instruments	26
29					Flaws in aircraft system maintenance process definition - stickshaker	136
30					Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149

31				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
32				Inadequate certification process and / or flaws in methodology concerning verification 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
40				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - anti-ice 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
1	24	Incorrect Control	TO05B73	The pilot applies incorrect control to the aircraft. This can be due to improper training, stress and fatigue	
2				Flaws in pilot requirements definition process and/or training methodology	168
3				Pilot tiredness - Inadequate workload distribution	167
4				Lack of adherence to AFM in terms of emergency procedures - stall recovery	292
5				Inadequate stall recovery procedure for the aircraft	152
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				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
11				Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201
12				Incorrect stab-trim setting	258
13				Undetected incorrect takeoff configuration	259
14				System failure affecting aircraft configuration, controllability and/or flying qualities	25
15				System failure affecting the operation of primary instruments / displays or standby instruments	26
16				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
17				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
18				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 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	168
21				Incorrect use of automation - TOCW System	192
22				Flaws in aircraft system maintenance process definition - TOCW System	204
23				Unintuitive and / or error prone system manual - TOCW	219
24				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System	229
25				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components	230
26				Flaws in manufacturer quality control process - Power supply system components	238
27				Flaws in aircraft system maintenance process definition - Electrical wiring System	252
28				Contaminated wing	12
29				Extreme icing conditions encounter	20
30				System failure affecting the operation of primary instruments / displays or standby instruments	26
31				Flaws in aircraft system maintenance process definition - stickshaker	136
32				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
33				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
34				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - stickshaker system components	161
35				Pilot tiredness - Inadequate workload distribution	167
36				Flaws in pilot requirements definition process and/or training methodology	168
37				Inadequate aircraft de-icing / anti-icing	180
38				Lack of adherence to SOP in terms of awareness on supporting systems warning - stickshaker	197
39				Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing	208
40				Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.	210
41				Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT)	212
42				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - anti-ice fluid HOT	213
43				Applied de-icing / anti-icing method is not sufficient for predicted conditions	228
44				Lack of adherence to SOP in terms of aircraft icing monitoring	231
1	25	Insufficient control	TO05B74	The pilot applies correct measures but are not enough to prevent aircraft leaving off the side of the runway	
2				Flaws in pilot requirements definition process and/or training methodology	168
3				Pilot tiredness - Inadequate workload distribution	167
4				Lack of adherence to AFM in terms of emergency procedures - stall recovery	292
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
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
10				Lack of adherence to SOP for take-off procedure in terms of checking take-off 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	25

13				System failure affecting the operation of primary instruments / displays or standby instruments	26
14				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
15				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
16				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				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 of the system / product compliance with requirements - TOCW System	229
23				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system 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
26				Contaminated wing	12
27				Extreme icing conditions encounter	20
28				System failure affecting the operation of primary instruments / displays or standby instruments	26
29				Flaws in aircraft system maintenance process definition - stickshaker	136
30				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
31				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
32				Inadequate certification process and / or flaws in methodology concerning verification 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
40				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - anti-ice 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
I	Single Engine Failure			Single Engine Failure	
1	1 Unsuccessful Manufacturing	TO09B11	Manufacture failure of a part of the engine which creates an undetectable defect or a defect that is detectable by the manufacturers testing but not by maintenance testing	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or 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
1	2 Unsuccessful Maintenance	TO09B12	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	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 - Engine systems and / or components	454
4				Flaws in manufacturer quality control process - Engine systems and / or components	458
5				Flaws in aircraft system maintenance process definition - Engine systems and / or components	463
1	3 Unsuccessful Manufacture and Maintenance	TO09B13	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	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 - Engine systems and / or components	454
4				Flaws in manufacturer quality control process - Engine systems and / or components	458
5				Flaws in aircraft system maintenance process definition - Engine systems and / or components	463
1	4 Foreign Object Damage	TO09B14	Engine ingests objects such as debris left on the runway by other aircraft or it suffers a bird strike	Wildlife incursion	5
2				Bird strike	34
3				Contaminated Runway	39
4				Tire burst	80
5				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
6				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
7				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162
8				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216
9				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
10				Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401
11				Flaws in aircraft system maintenance process definition - Landing gear components.	377
12				Flaws in manufacturer quality control process - Landing gear components.	376
II+ II	Flight crew rejects take-off			Flight crew rejects take-off	

1	5 Pilot Misdiagnosis	TO09B211	The pilot either misdiagnoses the situation or misunderstands the effects caused by a single engine failure, and hence 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, failure recognition and preparedness	209			
4				Wildlife incursion	5			
5				Bird strike	34			
6				Contaminated Runway	39			
7				Tire burst	80			
8				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149			
9				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150			
10				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162			
11				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - 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			
13				Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401			
14				Inadequate certification process and / or flaws in methodology concerning verification 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			
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			
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				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				Wildlife incursion	5			
5				Bird strike	34			
6				Contaminated Runway	39			
7				Tire burst	80			
8				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149			
9				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150			
10				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162			
11				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - 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			
13				Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401			
14				Inadequate certification process and / or flaws in methodology concerning verification 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			
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			
1	Take-off rejected correctly when below V1	TO09B22	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.	not identifiable at that level				
2				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			
7				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150			
8				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162			
9				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216			
10				Inadequate certification process and / or flaws in methodology concerning verification 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 integrity monitoring	401			
12				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components	454			
13				Flaws in manufacturer quality control process - Engine systems and / or components	458			
14				Flaws in aircraft system maintenance process definition - Engine systems and / or 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			
III+ III				Flight crew fails to maintain control (Take-off rejected)	TO09B31	No input to controls will allow the pilot to maintain control of the aircraft after take-off rejection	Flight crew fails to maintain control (Take-off rejected)	
1							8 Uncontrollable	not identifiable at the moment
2	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
7				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
8				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162
9				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216
10				Inadequate certification process and / or flaws in methodology concerning verification 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 integrity monitoring	401
12				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components	454
13				Flaws in manufacturer quality control process - Engine systems and / or components	458
14				Flaws in aircraft system maintenance process definition - Engine systems and / or 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
17				Pilot tiredness - Inadequate workload distribution	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				Poor application of T/O & RTO procedure, failure recognition and preparedness	209
1	9	Lack of control	TO09B32	The pilot makes no attempt to control the aircraft after take-off rejection	
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, aircraft handling	388
5				Wildlife incursion	5
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
10				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
11				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162
12				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216
13				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
14				Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401
15				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components	454
16				Flaws in manufacturer quality control process - Engine systems and / or components	458
17				Flaws in aircraft system maintenance process definition - Engine systems and / or components	463
18				Flaws in aircraft system maintenance process definition - Landing gear components.	377
19				Flaws in manufacturer quality control process - Landing gear components.	376
20				Pilot tiredness - Inadequate workload distribution	167
21				Flaws in pilot requirements definition process and/or training methodology	168
22				Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207
23				Poor application of T/O & RTO procedure, failure recognition and preparedness	209
1	10	Incorrect Control	TO09B33	The pilot applies incorrect control to the aircraft after take-off rejection. This can be due to improper training, stress and fatigue	
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, aircraft handling	388
5				Wildlife incursion	5
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
10				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
11				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162
12				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216
13				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
14				Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401
15				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components	454
16				Flaws in manufacturer quality control process - Engine systems and / or components	458
17				Flaws in aircraft system maintenance process definition - Engine systems and / or components	463
18				Flaws in aircraft system maintenance process definition - Landing gear components.	377
19				Flaws in manufacturer quality control process - Landing gear components.	376
20				Pilot tiredness - Inadequate workload distribution	167
21				Flaws in pilot requirements definition process and/or training methodology	168
22				Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207
23				Poor application of T/O & RTO procedure, failure recognition and preparedness	209
1	11	Insufficient control	TO09B34	The pilot applies correct measures after take-off rejection but are not enough to prevent aircraft leaving off the side of the runway	
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, aircraft handling	388

4				Wildlife incursion	5
5				Bird strike	34
6				Contaminated Runway	39
7				Tire burst	80
8				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
9				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
10				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162
11				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - 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
13				Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401
14				Inadequate certification process and / or flaws in methodology concerning verification 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
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	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
IV+ III+ II+I	IV	Failure to achieve maximum braking		Failure to achieve maximum braking	
1	12	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.	
2				Convective weather - heavy rain resulted with wet RWY surface	75
3				Pilot tiredness - Inadequate workload distribution	167
4				Flaws in pilot requirements definition process and/or training methodology	168
5				Gross error in takeoff weight entry and/or in V1 / VR speeds assessment	179
6				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
7				High energy RTO rate is an indicator of improper Operator's policy for T/O operations.	211
8				Poor application of T/O & RTO procedure, computation of T/O parameters	260
9				Wildlife incursion	5
10				Bird strike	34
11				Contaminated Runway	39
12				Tire burst	80
13				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
14				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
15				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162
16				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216
17				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
18				Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401
19				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components	454
20				Flaws in manufacturer quality control process - Engine systems and / or components	458
21				Flaws in aircraft system maintenance process definition - Engine systems and / or components	463
22				Flaws in aircraft system maintenance process definition - Landing gear components.	377
23				Flaws in manufacturer quality control process - Landing gear components.	376
24				Pilot tiredness - Inadequate workload distribution	167
25				Flaws in pilot requirements definition process and/or training methodology	168
26				Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207
27				Poor application of T/O & RTO procedure, failure recognition and preparedness	209
28				Pilot tiredness - Inadequate workload distribution	167
29				Flaws in pilot requirements definition process and/or training methodology	168
5	13	Brakes not functioning correctly	TO09B42	Brakes are not giving maximum braking, i.e. because of improper maintenance and damages	
6				System failure affecting aircraft configuration, controllability and/or flying qualities	25
7				Contaminated Runway	39
8				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
9				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
10				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216
11				Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake).	366
12				Wildlife incursion	5
13				Bird strike	34
14				Contaminated Runway	39
15				Tire burst	80
16				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150

17				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162
18				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216
19				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
20				Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401
21				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components	454
22				Flaws in manufacturer quality control process - Engine systems and / or components	458
23				Flaws in aircraft system maintenance process definition - Engine systems and / or 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
28				Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207
29				Poor application of T/O & RTO procedure, failure recognition and preparedness	209
30				Pilot tiredness - Inadequate workload distribution	167
31				Flaws in pilot requirements definition process and/or training methodology	168
32				Poor application of T/O & RTO procedure, aircraft handling	388
1	14	Brakes not applied correctly	TO09B43	Failure of the flight crew to apply all the braking systems immediately after take-off rejection.	
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, braking initiation sequence	199
5				Wildlife incursion	5
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
10				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
11				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162
12				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216
13				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
14				Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401
15				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components	454
16				Flaws in manufacturer quality control process - Engine systems and / or components	458
17				Flaws in aircraft system maintenance process definition - Engine systems and / or components	463
18				Flaws in aircraft system maintenance process definition - Landing gear components.	377
19				Flaws in manufacturer quality control process - Landing gear components.	376
20				Pilot tiredness - Inadequate workload distribution	167
21				Flaws in pilot requirements definition process and/or training methodology	168
22				Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207
23				Poor application of T/O & RTO procedure, failure recognition and preparedness	209
24				Pilot tiredness - Inadequate workload distribution	167
25				Flaws in pilot requirements definition process and/or training methodology	168
26				Poor application of T/O & RTO procedure, aircraft handling	388
V+V		Flight crew fails to maintain control (Take-off continued)		Flight crew fails to maintain control (Take-off continued)	
1	15	Uncontrollable	TO09B51	No input to controls will allow the pilot to maintain control of the aircraft after take-off continuation	
2				not identifiable at that level	
3				Wildlife incursion	5
4				Bird strike	34
5				Contaminated Runway	39
6				Tire burst	80
7				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
8				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
9				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162
10				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216
11				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 integrity monitoring	401
13				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components	454
14				Flaws in manufacturer quality control process - Engine systems and / or components	458
15				Flaws in aircraft system maintenance process definition - Engine systems and / or components	463
16				Flaws in aircraft system maintenance process definition - Landing gear components.	377
17				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	
2				Pilot tiredness - Inadequate workload distribution	167
3				Flaws in pilot requirements definition process and/or training methodology	168
4				Lack of adherence to AFM in terms of emergency procedures - stall recovery	292
5				Wildlife incursion	5
6				Bird strike	34
7				Contaminated Runway	39

7				Tire burst	80
8				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
9				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
10				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162
11				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - 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
13				Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401
14				Inadequate certification process and / or flaws in methodology concerning verification 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
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
1	17	Incorrect Control	TO09B53	The pilot applies incorrect control to the aircraft after take-off continuation. This can be due to improper training, stress and fatigue	
2				Pilot tiredness - Inadequate workload distribution	167
3				Flaws in pilot requirements definition process and/or training methodology	168
4				Lack of adherence to AFM in terms of emergency procedures - stall recovery	292
5				Wildlife incursion	5
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
10				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
11				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162
12				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216
13				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
14				Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401
15				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components	454
16				Flaws in manufacturer quality control process - Engine systems and / or components	458
17				Flaws in aircraft system maintenance process definition - Engine systems and / or components	463
18				Flaws in aircraft system maintenance process definition - Landing gear components.	377
1	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	
2				Pilot tiredness - Inadequate workload distribution	167
3				Flaws in pilot requirements definition process and/or training methodology	168
4				Lack of adherence to AFM in terms of emergency procedures - stall recovery	292
5				Wildlife incursion	5
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
10				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
11				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162
12				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216
13				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
14				Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401
15				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components	454
16				Flaws in manufacturer quality control process - Engine systems and / or components	458
17				Flaws in aircraft system maintenance process definition - Engine systems and / or components	463
18				Flaws in aircraft system maintenance process definition - Landing gear components.	377
1		Pitch Control Problem		Pitch Control Problem	376
1	1	Trim settings incorrectly determined	TO10B1111	Flight crew fail to complete the trim configuration checklist and fail to verify the checklist	
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 determining of aircraft configuration.	198
1	2	Speed settings incorrectly determined	TO10B1112	Flight crew fail to complete the speed bug checklist and fail to verify the checklist	
2				Pilot tiredness - Inadequate workload distribution	167
3				Flaws in pilot requirements definition process and/or training methodology	168
1	3	Trim settings incorrectly entered into FMC	TO10B112	Given that the trim settings have been correctly determined, the co-pilot enter the settings incorrectly and these are verified by the captain during the taxi checklist	
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				Pilot tiredness - Inadequate workload distribution	167

3				Flaws in pilot requirements definition process and/or training methodology	168
1	4	Speed settings incorrectly entered into FMC	TO10B113	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	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties
2				Pilot tiredness - Inadequate workload distribution	167
3				Flaws in pilot requirements definition process and/or training methodology	168
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
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
1	6	Unsuccessful Design	TO10B1311	Unsuccessful design of one of the integral components causes the failure of a flight control system	System failure affecting the operation of primary instruments / displays or standby instruments
2				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FCS system or components	420
1	7	Unsuccessful Manufacture	TO10B1312	Unsuccessful manufacture of one of the integral components causes the failure of a flight control system	System failure affecting the operation of primary instruments / displays or standby instruments
2				Flaws in manufacturer quality control process - FCS system components	421
1	8	Unsuccessful Maintenance	TO10B1313	Maintenance of the flight control system is not conducted or not successfully completed such that one of the flight control system fails	System failure affecting the operation of primary instruments / displays or standby instruments
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				Flaws in aircraft system maintenance process definition - FCS systems or components	422
1	9	Foreign Object Damage	TO10B1314	A foreign object strikes one of the control surfaces rendering it ineffective. Such objects include birds and runway debris	Wildlife incursion
2				Bird strike	34
3				Contaminated Runway	39
4				Tire burst	80
5				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
6				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
7				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162
8				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216
9				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
10				Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401
11				Flaws in aircraft system maintenance process definition - Landing gear components.	377
12				Flaws in manufacturer quality control process - Landing gear components.	376
1	10	Severe Flight Control System Failure	TO10B132	Given the occurrence of a flight control system failure, the failure is severe enough to cause a pitch control problem	System failure affecting the operation of primary instruments / displays or standby instruments
2				Slow rotation (i.e., low pitch rate)	371
3				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FCS system or components	420
4				Flaws in manufacturer quality control process - FCS system components	421
5				Flaws in aircraft system maintenance process definition - FCS systems or components	422
III+ II		Flight crew rejects to take-off			Flight crew rejects to take-off
1	11	Crew Misdiagnose Situation	TO10B211	The pilot misdiagnoses the situation and either fails to realise what is causing the pitch control problems or wrongly attributes them to something else.	Pilot tiredness - Inadequate workload distribution
2				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				Wildlife incursion	5
5				System failure affecting the operation of primary instruments / displays or standby 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
10				Maintenance technician / airworthiness specialist tiredness - Inadequate workload 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
16				Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201
17				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216
18				Incorrect stab-trim setting	258
19				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
20				Slow rotation (i.e., low pitch rate)	371
21				Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401
22				Lack of adherence to SOP for take-off procedure in terms of speed bug checklist preparation and verification.	419

23				Inadequate certification process and / or flaws in methodology concerning verification 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
1	12	Crew Misjudge Situation	TO10B212	The flight crew diagnoses the situation, realising what is causing the pitch control problems but misjudges the situation and incorrectly aborts the take-off when the aircraft is above V1	
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, adherence to SOP, criteria for STOP decision	207
5				Wildlife incursion	5
6				System failure affecting the operation of primary instruments / displays or standby instruments	26
7				Bird strike	34
8				Contaminated Runway	39
9				Tire burst	80
10				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
11				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
12				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
13				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162
14				Pilot tiredness - Inadequate workload distribution	167
15				Flaws in pilot requirements definition process and/or training methodology	168
16				Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.	198
17				Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201
18				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216
19				Incorrect stab-trim setting	258
20				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
21				Slow rotation (i.e., low pitch rate)	371
22				Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401
23				Lack of adherence to SOP for take-off procedure in terms of speed bug checklist preparation and verification.	419
24				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FCS system or components	420
25				Flaws in manufacturer quality control process - FCS system components	421
26				Flaws in aircraft system maintenance process definition - FCS systems or components	422
27				Flaws in aircraft system maintenance process definition - Landing gear components.	377
1	13	Take-off rejected correctly when below V1	TO10B22	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.	
2				not identifiable at that level	
3				Wildlife incursion	5
4				System failure affecting the operation of primary instruments / displays or standby instruments	26
5				Bird strike	34
6				Contaminated Runway	39
7				Tire burst	80
8				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
9				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
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				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162
12				Pilot tiredness - Inadequate workload distribution	167
13				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 configuration.	198
15				Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201
16				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216
17				Incorrect stab-trim setting	258
18				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
19				Slow rotation (i.e., low pitch rate)	371
20				Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401
21				Lack of adherence to SOP for take-off procedure in terms of speed bug checklist preparation and verification.	419
22				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FCS system or components	420
23				Flaws in manufacturer quality control process - FCS system components	421
24				Flaws in aircraft system maintenance process definition - FCS systems or components	422
25				Flaws in aircraft system maintenance process definition - Landing gear components.	377
26				Flaws in manufacturer quality control process - Landing gear components.	376
III+ I+II	III	Failure to achieve maximum braking		Failure to achieve maximum braking	

1	14	Insufficient Runway Length	TO10B31	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.	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	179
5					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
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					Wildlife incursion	5
9					System failure affecting the operation of primary instruments / displays or standby instruments	26
10					Bird strike	34
11					Contaminated Runway	39
12					Tire burst	80
13					Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
14					Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
15					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
16					Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162
17					Pilot tiredness - Inadequate workload distribution	167
18					Flaws in pilot requirements definition process and/or training methodology	168
19					Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.	198
20					Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201
21					Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216
22					Incorrect stab-trim setting	258
23					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
24					Slow rotation (i.e., low pitch rate)	371
25					Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401
26					Lack of adherence to SOP for take-off procedure in terms of speed bug checklist preparation and verification.	419
27					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FCS system or components	420
28					Flaws in manufacturer quality control process - FCS system components	421
29					Flaws in aircraft system maintenance process definition - FCS systems or components	422
30					Flaws in aircraft system maintenance process definition - Landing gear components.	377
31					Flaws in manufacturer quality control process - Landing gear components.	376
32					Pilot tiredness - Inadequate workload distribution	167
33					Flaws in pilot requirements definition process and/or training methodology	168
34					Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207
35					Poor application of T/O & RTO procedure, failure recognition and preparedness	209
1	15	Brakes not functioning correctly	TO10B32	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					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 distribution	150
5					Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216
6					Flaws in aircraft system maintenance process definition - marshalling/rolling/taxing control related system and components (incl. brake).	366
7					Wildlife incursion	5
8					System failure affecting the operation of primary instruments / displays or standby instruments	26
9					Bird strike	34
10					Contaminated Runway	39
11					Tire burst	80
12					Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
13					Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
14					Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
15					Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162
16					Pilot tiredness - Inadequate workload distribution	167
17					Flaws in pilot requirements definition process and/or training methodology	168
18					Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.	198
19					Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201
20					Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216
21					Incorrect stab-trim setting	258
22					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
23					Slow rotation (i.e., low pitch rate)	371
24					Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401
25					Lack of adherence to SOP for take-off procedure in terms of speed bug checklist preparation and verification.	419

26				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FCS system or components	420
27				Flaws in manufacturer quality control process - FCS system components	421
28				Flaws in aircraft system maintenance process definition - FCS systems or components	422
29				Flaws in aircraft system maintenance process definition - Landing gear components.	377
30				Flaws in manufacturer quality control process - Landing gear components.	376
31				Pilot tiredness - Inadequate workload distribution	167
32				Flaws in pilot requirements definition process and/or training methodology	168
33				Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207
34				Poor application of T/O & RTO procedure, failure recognition and preparedness	209
1	16	Brakes not applied correctly	TO10B33	Failure of the flight crew to apply all the braking systems immediately after take-off rejection.	
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, braking initiation sequence	199
5				Wildlife incursion	5
6				System failure affecting the operation of primary instruments / displays or standby instruments	26
7				Bird strike	34
8				Contaminated Runway	39
9				Tire burst	80
10				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
11				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
12				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
13				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162
14				Pilot tiredness - Inadequate workload distribution	167
15				Flaws in pilot requirements definition process and/or training methodology	168
16				Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.	198
17				Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201
18				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216
19				Incorrect stab-trim setting	258
20				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
21				Slow rotation (i.e., low pitch rate)	371
22				Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401
23				Lack of adherence to SOP for take-off procedure in terms of speed bug checklist preparation and verification.	419
24				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FCS system or components	420
25				Flaws in manufacturer quality control process - FCS system components	421
26				Flaws in aircraft system maintenance process definition - FCS systems or components	422
27				Flaws in aircraft system maintenance process definition - Landing gear components.	377
28				Flaws in manufacturer quality control process - Landing gear components.	376
29				Pilot tiredness - Inadequate workload distribution	167
30				Flaws in pilot requirements definition process and/or training methodology	168
31				Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207
32				Poor application of T/O & RTO procedure, failure recognition and preparedness	209
IV+	IV	Aircraft fails to rotate and lift off		Aircraft fails to rotate and lift off	
1	17	Pitch Control Misdiagnosed	TO10B41	Flight crew fail to diagnose the cause of the pitch control problems and hence fails to rectify the problem.	
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, aircraft handling	388
5				Wildlife incursion	5
6				System failure affecting the operation of primary instruments / displays or standby instruments	26
7				Bird strike	34
8				Contaminated Runway	39
9				Tire burst	80
10				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
11				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
12				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
13				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162
14				Pilot tiredness - Inadequate workload distribution	167
15				Flaws in pilot requirements definition process and/or training methodology	168
16				Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.	198
17				Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201
18				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216
19				Incorrect stab-trim setting	258
20				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
21				Slow rotation (i.e., low pitch rate)	371
22				Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401
23				Lack of adherence to SOP for take-off procedure in terms of speed bug checklist preparation and verification.	419

23				Inadequate certification process and / or flaws in methodology concerning verification 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
1	18	Unsuccessful Pitch Control Rectification	TO10B42	Flight crew diagnoses the causes of the pitch control problem but fails to rectify it	
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, aircraft handling	388
5				Wildlife incursion	5
6				System failure affecting the operation of primary instruments / displays or standby instruments	26
7				Bird strike	34
8				Contaminated Runway	39
9				Tire burst	80
10				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
11				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
12				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
13				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162
14				Pilot tiredness - Inadequate workload distribution	167
15				Flaws in pilot requirements definition process and/or training methodology	168
16				Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.	198
17				Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201
18				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216
19				Incorrect stab-trim setting	258
20				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
21				Slow rotation (i.e., low pitch rate)	371
22				Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401
23				Lack of adherence to SOP for take-off procedure in terms of speed bug checklist preparation and verification.	419
24				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FCS system or components	420
25				Flaws in manufacturer quality control process - FCS system components	421
26				Flaws in aircraft system maintenance process definition - FCS systems or components	422
27				Flaws in aircraft system maintenance process definition - Landing gear components.	377
				Flaws in manufacturer quality control process - Landing gear components.	376

Base events		Code	Definition	identifiable precursors	No.
ESD 31	Base events	Code	Definition	identifiable precursors	No.
I	I		Aircraft are positioned on collision course	Aircraft are positioned on collision course	
1	1 Strategic conflict	ER31F53	Unmodified flight plan requests would lead to separation infringement	Flaws in Airspace and Air Traffic planning procedures design process	323
2	2 Ineffective ATFCM	ER31B10	Failure of air traffic flow and capacity management (ATFCM) to 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	323 321
				Flaws in conflict and separation minima infringement detection / elimination procedures	326
3	3 No ATC planning	ER31B91	No attempts are made to identify pre-tactical conflicts before they reach the Tactical Controller	Flaws in conflict and separation minima infringement detection / elimination procedures Tactical or / and Planning Controller tiredness - Inadequate workload distribution	326 300
				Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology	301
4	4 Inadequate strategic surveillance picture	ER31B9211	The radar picture is inadequate to allow the Planning Controller to identify the pre-tactical conflict, e.g. incomplete traffic picture, picture with overlapping labels, or too much traffic for the display system	Flaws in Airspace and Air Traffic planning procedures design process	323
5	5 Inadequate flight plan data	ER31B9212	Flight plan data is inadequate to allow the Planning Controller to 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.	Inadequate coordination between ATM centers and/or ATC sectors Lack of adherence of airlines to time constraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data.	321 327
				Flaws in Airspace and Air Traffic planning procedures design process	323
6	6 Planning controller failure to recognise conflict	ER31B922	Planning Controller obtain correct flight information but fails to recognise medium-term conflict. This includes failure of MTCD if present	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 - MTCD System	328
7	7 Planning controller misjudgement of conflict prevention	ER31B923	Planning Controller aware of the conflict but misjudges the traffic situation and results in an inadequate separation plan	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
8	8 Inadequate planning controller coordination	ER31B93	Planning Controller fails to coordinate with other sectors, resulting in failure to implement planned traffic synchronisation	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 coordination between ATM centers and/or ATC sectors	321
				Flaws in Airspace and Air Traffic planning procedures design process	323
9	9 Planning controller failure to alert tactical controller to conflict	ER31B94	Planning Controller fails to inform Tactical Controller of a conflict	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 coordination between ATM centers and/or ATC sectors	321
10	10 Inadequate tactical surveillance picture	ER31B5111	The radar picture is inadequate to allow the Tactical Controller to maintain separation in a plannable conflict, e.g. incomplete traffic picture or picture with overlapping labels	Flaws in Airspace and Air Traffic planning procedures design process Lack of adherence of airlines to time constraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data.	323 327
11	11 Inadequate flight plan data	ER31B5112	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 obtained too late, or aircraft not following flight plan.	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
				Failure to identify the pre-tactical conflict before it reach the tactical controller	330
				Lack of adherence of airlines to declared Flight Plan.	329
				Lack of adherence of airlines to time constraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data.	327
12	12 ATCO failure to recognise conflict	ER31B512	Tactical Controller obtains adequate flight information but fails to recognise the conflict	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
13	13 ATCO misjudgement in tactical separation	ER31B513	Tactical Controller recognises the conflict, but misjudges the traffic situation and hence makes incorrect clearances or separation instructions to the aircraft	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
				Lack of adherence to SOP for Airborne operation in terms of minimum separation	331
14	14 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 Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology	300 301
				Inadequate coordination between ATM centers and/or ATC sectors	321
15	15 Inadequate ATCO transmission of instructions	ER31B521	Inadequate transmission of instruction from ATCO, e.g. incorrect clearance, late clearance and unclear phraseology	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	132 133 134 137
				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
16	16 Loss of communication	ER31B522	Communication between ATCO and pilot is lost due to technical failure or human error	Prolonged loss of communication (PLOC) between pilot and controller Traffic controller tiredness - Inadequate workload distribution	73 137

Base events	Code	Definition	identifiable precursors	No.
			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
			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
			Incorrect use of communication equipment	336
17	17	Inadequate pilot readback	ER31B523	Failure of adequate readback from pilot and failure of ATCO to challenge the failure
			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 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 omitted	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
			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
			Failure to comply with an altitude or speed restriction / constraint	315
			Military activity in controlled airport or located within controlled area	339
19	19	Conflict due to military traffic	ER31F6111	Unauthorised penetration of controlled airspace by military traffic
			Unauthorised penetration of controlled airspace by VFR (Visual Flight Rule) traffic	
			General aviation activity in controlled airport or located within controlled area	340
20	20	Conflict due to VFR traffic	ER31F6112	Inadequate transmission of instruction from ATCO that leads to a vertical deviation of the aircraft
21	21	Inadequate ATCO transmission of instructions	ER31F61211	Inadequate transmission of instruction from ATCO that leads to a vertical deviation of the aircraft
			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 adherence to SOP in terms of communication between ATC and pilot / vehicle driver	148
22	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
			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
			Pilot tiredness - Inadequate workload distribution	167
			Flaws in pilot requirements definition process and/or training methodology	168
			Hearback omitted	169
23	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 follow SID or climb/ descent without clearance.
			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 Rules of the Air - adherence to Controller clearance	296
24	24	Altimeter setting error	ER31F6123	Vertical deviation of aircraft due to inadequate altimeter settings
			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
			Altimeter setting error	274
			Lack of adherence to SOP for take-off procedure in terms of altimeter calibration.	294
25	25	Technical failure in autopilot or nav equipment	ER31F6124	Vertical deviation of aircraft due to technical failure in autopilot or navigation equipment
			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
			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
			Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)	410
			Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491
			Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492
			Flaws in manufacturer quality control process - Onboard navigational systems and components.	493
26	26	ACAS RA	ER31F6125	Response to ACAS Resolution Advisory or other in-flight emergency requiring a vertical deviation
			Airspace infringement	71
			Traffic controller tiredness - Inadequate workload distribution	137
			Flaws in traffic controller requirements definition process and/or training methodology	145

Base events		Code	Definition	identifiable precursors	No.
				Pilot tiredness - Inadequate workload distribution	167
				Flaws in pilot requirements definition process and/or training methodology	168
				Altitude deviation	312
				Level bust (pilot lapse or late re-clearance by ATC)	313
				Deviation from flight trajectory commanded by controller	343
27	27	Weather induced level bust	ER31F6126	Vertical deviation resulting from weather conditions	18
				Convective weather encounter	
28	28	Level bust results in conflict	ER31C6	Given a level bust occurs, the aircraft has separation infringement with another aircraft	76
				Convective weather encounter in traffic intensive airport proximity	
29	29	Inadequate tactical surveillance picture	ER31B611	The radar picture is inadequate to allow the Tactical Controller to maintain separation in an unplanable conflict, e.g. missing or unidentified targets	71
				Airspace infringement	
				System failure affecting the operation of primary instruments / displays or standby instruments - ADS-B System	78
30	30	ATCO failure to recognise conflict in time	ER31B612	ATCO fails to recognise the unplanable conflict in time to issue separation instructions	71
				Airspace infringement	
				Traffic controller tiredness - Inadequate workload distribution	137
				Flaws in traffic controller requirements definition process and/or training methodology	145
				Altitude deviation	312
				Level bust (pilot lapse or late re-clearance by ATC)	313
				Navigation deviation	317
				Deviation from flight trajectory commanded by controller	343
31	31	Inadequate ATCO transmission of instructions	ER31B621	Inadequate transmission of instruction for an unplanable conflict from ATCO results in failure to maintain separation	132
				Lack of English proficiency	
				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	32	Loss of communication	ER31B622	Communication between ATCO and pilot is lost during an unplanable conflict due to technical failure or human error	73
				Prolonged loss of communication (PLOC) between pilot and controller	
				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 systems and components.	271
				Flaws in manufacturer quality control process - Communication equipment systems and components.	272
				Unintuitive and / or error prone system manual - communication equipment.	305
				Incorrect use of communication equipment	336
33	33	Inadequate pilot readback	ER31B623	Failure of adequate readback from pilot during an unplanable conflict and failure of ATCO to challenge the failure	132
				Lack of English proficiency	
				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
				Pilot tiredness - Inadequate workload distribution	167
				Flaws in pilot requirements definition process and/or training methodology	168
				Hearback omitted	169
34	34	Inadequate pilot response to ATC	ER31B63	Flight crew fail to follow the clearances or separation instructions	151
				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 Rules of the Air - adherence to Controller clearance	296
35	35	Trajectory instructions result in conflict	ER31F71	Trajectory instructions from ATCO create a conflict that was not previously present	137
				Traffic controller tiredness - Inadequate workload distribution	
				Flaws in traffic controller requirements definition process and/or training methodology	145
36	36	Ineffective tactical separation of ATCO induced conflict	ER31B7	ATCO does not recognise or resolve the conflict they have created	137
				Traffic controller tiredness - Inadequate workload distribution	
				Flaws in traffic controller requirements definition process and/or training methodology	145
				Flaws in conflict and separation minima infringement detection / elimination procedures	326
37	37	Conflict in uncontrolled airspace	ER31F81	A conflict occurs in uncontrolled airspace where separation is the responsibility of the pilot	342
				Intensified traffic related to general aviation activity e. g. over GA airport / airfield	
38	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 airspace	137
				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
39	39	Inadequate ATCO transmission of information	ER31B821	Inadequate transmission of traffic information prevents the pilot maintaining separation in uncontrolled airspace	323
				Flaws in Airspace and Air Traffic planning procedures design process	
40	40	Loss of communication	ER31B822	Communication between ATCO and pilot is lost during a conflict in uncontrolled airspace due to technical failure or human error	73
				Prolonged loss of communication (PLOC) between pilot and controller	
				Traffic controller tiredness - Inadequate workload distribution	137

Base events	Code	Definition	identifiable precursors	No.
			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 systems and components.	271
			Flaws in manufacturer quality control process - Communication equipment systems and components.	272
			Unintuitive and / or error prone system manual - communication equipment.	305
			Incorrect use of communication equipment	336
41	41	Inadequate pilot readback	ER31B823	Failure of adequate readback from pilot during an conflict in uncontrolled airspace and failure of ATCO to challenge the failure
			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
			Pilot tiredness - Inadequate workload distribution	167
			Flaws in pilot requirements definition process and/or training methodology	168
			Hearback omitted	169
42	42	Inadequate separation by pilot	ER31B83	Pilot receives the necessary traffic information for an conflict in controlled airspace but fails to maintain separation
			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 Rules of the Air - adherence to Controller clearance	296
43	43	Separation recovery essential	ER31C4	Given a separation infringement occurs, recovery action is needed to avoid an imminent collision
			Other cases of loss of separation	72
			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 certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ADI system components	320
II	II	ATC fails to detect and resolve the conflict		ATC fails to detect and resolve the conflict
44	44	No STCA coverage	ER31B31	ATCO responsible for the aircraft does not have short-term conflict alert (STCA) installed, or it does not cover the location of the conflict
			Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of STCA System.	344
			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 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 omitted	169
			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
			Altimeter setting error	274
			Lack of adherence to SOP for take-off procedure in terms of altimeter calibration.	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.)	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
			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

Base events	Code	Definition	identifiable precursors	No.	
			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 constraints 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 separation	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.)	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	
45	45	STCA fails to give warning in time	ER31B32	Failure of STCA to alert ATCO to a conflict	351
			Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - STCA System	351	
			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 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 omitted	169	
			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	
			Altimeter setting error	274	
			Lack of adherence to SOP for take-off procedure in terms of altimeter calibration.	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.)	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	
			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	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 constraints 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 separation	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.)	410	

Base events	Code	Definition	identifiable precursors	No.	
			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	
46	46	ATCO fails to respond to STCA warning	ER31B33	Failure of ATCO to respond to the STCA warning	137
			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	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 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 omitted	169	
			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	
			Altimeter setting error	274	
			Lack of adherence to SOP for take-off procedure in terms of altimeter calibration.	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.)	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	
			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	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 constraints 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 separation	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.)	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	
47	47	ATCO fails to recover separation in time	ER31B34	ATCO responds to an STCA warning but fails to make effective resolving action in time	137
			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	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	

Base events	Code	Definition	identifiable precursors	No.
			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 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 omitted	169
			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
			Altimeter setting error	274
			Lack of adherence to SOP for take-off procedure in terms of altimeter calibration.	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.)	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
			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	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 constraints 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 separation	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.)	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
48	48 No independent ATCO monitoring	ER31B41	No other ATCO is monitoring the aircraft's trajectory independently	346
			Lack of adherence to regulations concerning independent ATCO monitoring	346
			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 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 omitted	169
			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
			Altimeter setting error	274
			Lack of adherence to SOP for take-off procedure in terms of altimeter calibration.	294

Base events	Code	Definition	identifiable precursors	No.
			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
			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	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 constraints 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 - MTC 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 separation	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.)	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
49	49	Other ATCOs fail to detect conflict	ER31B42	Other ATCOs monitoring the aircraft's trajectory fails to recognise 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	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 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 omitted	169
			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
			Altimeter setting error	274
			Lack of adherence to SOP for take-off procedure in terms of altimeter calibration.	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.)	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
			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	321
			Flaws in Airspace and Air Traffic planning procedures design process	323
			Flaws in conflict and separation minima infringement detection / elimination procedures	326

Base events	Code	Definition	identifiable precursors	No.
			Lack of adherence of airlines to time constraints 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 separation	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.)	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
50	ATCOs fail to communicate warning	ER31B43	Other ATCOs recognise the conflict but fails to communicate with the ATCO concerned	
			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	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 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 omitted	169
			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
			Altimeter setting error	274
			Lack of adherence to SOP for take-off procedure in terms of altimeter calibration.	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.)	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
			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	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 constraints 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 separation	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.)	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

Base events	Code	Definition	identifiable precursors	No.
			Flaws in manufacturer quality control process - Onboard navigational systems and components.	493
51	51	ATCO fails to recover separation in time	ER31B44	ATCO is informed by other ATCO of a conflict but fails to resolve it in time
			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
			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 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 omitted	169
			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
			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 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
			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	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 constraints 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 separation	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.)	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
III	III	Flight crew fails to detect and resolve conflict		Flight crew fails to detect and resolve conflict
52	52	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
			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

Base events	Code	Definition	identifiable precursors	No.	
			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 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 omitted	169	
			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	
			Altimeter setting error	274	
			Lack of adherence to SOP for take-off procedure in terms of altimeter calibration.	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.)	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	
			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	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 constraints 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 separation	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.)	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	
			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 of the system / product compliance with requirements - STCA System	351	
53	53	ACAS fails to give RA in time	ER31B22	ACAS fails to give the pilot a resolution advisory (RA) in time to resolve a conflict	
			Failures affecting TCAS operation	74	
			Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ACAS system components	290	
			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 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	

Base events	Code	Definition	identifiable precursors	No.
			Hearback omitted	169
			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
			Altimeter setting error	274
			Lack of adherence to SOP for take-off procedure in terms of altimeter calibration.	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.)	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
			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	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 constraints 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 separation	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.)	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
			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 of the system / product compliance with requirements - STCA System	351
54	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
			Pilot tiredness - Inadequate workload distribution	167
			Flaws in pilot requirements definition process and/or training methodology	168
			Late or inadequate response to ACAS warning	349
			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 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 omitted	169
			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
			Altimeter setting error	274

Base events	Code	Definition	identifiable precursors	No.
			Lack of adherence to SOP for take-off procedure in terms of altimeter calibration.	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.)	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
			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	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 constraints 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 separation	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.)	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
			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 of the system / product compliance with requirements - STCA System	351
55	55	ACAS avoidance invalidated by other aircraft	ER31B24	ACAS avoidance action is cancelled out by incorrect action from the other aircraft
			TCAS RA events (genuine or spurious)	70
			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
			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 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 omitted	169
			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
			Altimeter setting error	274
			Lack of adherence to SOP for take-off procedure in terms of altimeter calibration.	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.)	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

Base events	Code	Definition	identifiable precursors	No.	
			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	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 constraints 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 separation	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.)	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	
			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 of the system / product compliance with requirements - STCA System	351	
56	56	Other aircraft effectively invisible	ER31B111	The other aircraft cannot be seen from the cockpit	6
			Adverse weather / poor visibility conditions / darkness	6	
			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 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 omitted	169	
			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	
			Altimeter setting error	274	
			Lack of adherence to SOP for take-off procedure in terms of altimeter calibration.	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.)	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	
			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	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 constraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data.	327	

Base events	Code	Definition	identifiable precursors	No.
			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 separation	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.)	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
			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 of the system / product compliance with requirements - STCA System	351
57	57	Flight crew fail to observe visible aircraft in time	ER31B112	Pilots fail to observe visible aircraft in time to make avoidance 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
			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 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 omitted	169
			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
			Altimeter setting error	274
			Lack of adherence to SOP for take-off procedure in terms of altimeter calibration.	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.)	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
			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	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 constraints 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 separation	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

Base events	Code	Definition	identifiable precursors	No.
			Flaws in aircraft system maintenance process definition - FMS subsystems and 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
			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 of the system / product compliance with requirements - STCA System	351
58	58	Pilot fails to take avoidance action in time	ER31B113	Pilots fail to make appropriate avoidance action, having observed 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 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 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 omitted	169
			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
			Altimeter setting error	274
			Lack of adherence to SOP for take-off procedure in terms of altimeter calibration.	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.)	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
			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	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 constraints 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 separation	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.)	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
			Traffic controller tiredness - Inadequate workload distribution	137
			Flaws in traffic controller requirements definition process and/or training methodology	145

Base events		Code	Definition	identifiable precursors	No.
				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 of the system / product compliance with requirements - STCA System	351
59	59	ER31B114	Visual avoidance invalidated by other aircraft Pilot's response is cancelled out by opposing manoeuvre from the other aircraft	TCAS RA events (genuine or spurious)	70
				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 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 omitted	169
				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
				Altimeter setting error	274
				Lack of adherence to SOP for take-off procedure in terms of altimeter calibration.	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.)	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
				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	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 constraints 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 separation	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.)	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
				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 of the system / product compliance with requirements - STCA System	351
60	60	ER31B12	Ineffective visual warning on other aircraft Pilots on the conflicting aircraft fail to resolve the conflict using see & avoid techniques, given similar failure on the subject aircraft	Pilot tiredness - Inadequate workload distribution	167
				Flaws in pilot requirements definition process and/or training methodology	168
				Inappropriate visual avoidance maneuver	318
				System failure affecting the operation of primary instruments / displays or standby instruments	26

Base events	Code	Definition	identifiable precursors	No.
			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 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 omitted	169
			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
			Altimeter setting error	274
			Lack of adherence to SOP for take-off procedure in terms of altimeter calibration.	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.)	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
			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	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 constraints 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 separation	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.)	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
			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 of the system / product compliance with requirements - STCA System	351
61	61	Collision avoidance essential	ER31C3	Given failure of on board detection and resolution of the conflict, a collision is not avoided through providence
				not identifiable at that level
				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

Base events	Code	Definition	identifiable precursors	No.
			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
			Flaws in pilot requirements definition process and/or training methodology	168
			Hearback omitted	169
			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
			Altimeter setting error	274
			Lack of adherence to SOP for take-off procedure in terms of altimeter calibration.	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.)	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
			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	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 constraints 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 separation	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.)	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
			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 of the system / product compliance with requirements - STCA System	351

Base events		Code	Definition	Identifiable precursors	No.
Base events		Code	Definition	Identifiable precursors	No.
I	Unstable Approach			Unstable Approach	
1	1 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	Lack of adherence to SOP in terms of approach and landing	245
2				Pilot tiredness - Inadequate workload distribution	167
3				Flaws in pilot requirements definition process and/or training methodology	168
1	2 Check list failure	AL19B1121	Flight crew fail to conduct briefings and checklists, which leads to a CRM failure	Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing	246
2				Pilot tiredness - Inadequate workload distribution	167
3				Flaws in pilot requirements definition process and/or training methodology	168
1	3 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	245
2				Pilot tiredness - Inadequate workload distribution	167
3				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
1	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	Incorrect use of automation - FMS	269
2				Pilot tiredness - Inadequate workload distribution	167
3				Flaws in pilot requirements definition process and/or training methodology	168
4				Unintuitive and / or error prone system manual - FMS	494
1	5 Loss of visual	AL19B121	Flight crew losses visual reference with the runway when not on an ILS approach	Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path	248
2				Adverse weather / poor visibility conditions / darkness	6
1	6 Severe turbulence	AL19B122	Turbulence is so severe that no control input will stabilise the approach	Convective weather / turbulence / windshear or crosswind conditions during take-off	32
2				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.	249
1	7 Crosswind exceeded	AL19B123	Crosswind component for the aircraft is exceeded and it becomes unsafe for the aircraft to land	Convective weather / turbulence / windshear or crosswind conditions during take-off	32
2				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.	249
3				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
II + I	Flight crew fails to initiate and execute missed approach			Flight crew fails to initiate and execute missed approach	
1	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	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
8				Lack of adherence to SOP in terms of briefing and checklist before initiating of 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	269
12				Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path	248
13				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.	249
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.	295
15				Unintuitive and / or error prone system manual - FMS	494
1	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	Flaws in pilot requirements definition process and/or training methodology	168
2				Pilot tiredness - Inadequate workload distribution	167
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
8				Lack of adherence to SOP in terms of briefing and checklist before initiating of 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	269
12				Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path	248
13				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.	249
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.	295
15				Unintuitive and / or error prone system manual - FMS	494
1	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	Lack of adherence to AIR OPS normal procedures in terms of 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				Aggressive maneuvering / overcontrolling	182
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
10				Lack of adherence to SOP in terms of briefing and checklist before initiating of 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 supporting systems. Lack of ILS on descent path	248
15				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.	249
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.	295
17				Unintuitive and / or error prone system manual - FMS	494
1	11	PF fails to execute correctly	AL19B222	Flight crew initiate a missed approach but fail to take appropriate action to execute the missed approach	Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure
2					250
3					167
4					168
5					6
6					32
7					245
8					167
9					168
10					246
11					263
12					264
13					269
14					248
15					249
16					295
17					494
III + II + I	III	Flight crew fails to maintain control		Flight crew fails to maintain control	
1	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	not identifiable at the moment
2					6
3					32
4					245
5					167
6					168
7					246
8					263
9					264
10					269
11					248
12					249
13					295
14					494
15					167
16					168
17					250
18					182
1	13	Lack of control	AL19B32	The pilot makes no attempt to control the aircraft after failing to initiate or execute a missed approach	Lack of adherence to emergency procedures
2					448
3					151
4					167
5					168
6					6
7					32
8					245
9					167
10					168
11					246
12					263
13					264
14					269
15					248
16					249
17					295
18					494
19					167
20					168
21					250
					182

1	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	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
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
9					Lack of adherence to SOP in terms of briefing and checklist before initiating of 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
13					Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path	248
14					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.	249
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.	295
16					Unintuitive and / or error prone system manual - FMS	494
17					Pilot tiredness - Inadequate workload distribution	167
18					Flaws in pilot requirements definition process and/or training methodology	168
19					Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure	250
20					Aggressive maneuvering / overcontrolling	182
1	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	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
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
9					Lack of adherence to SOP in terms of briefing and checklist before initiating of 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
13					Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path	248
14					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.	249
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.	295
16					Unintuitive and / or error prone system manual - FMS	494
17					Pilot tiredness - Inadequate workload distribution	167
18					Flaws in pilot requirements definition process and/or training methodology	168
19					Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure	250
20					Aggressive maneuvering / overcontrolling	182
IV + I + II + III	IV	Structural failure			Structural failure	
1	16	Structure too weak	AL19B41	Landing gear/structure is too weak due to manufacturing defect, improper maintenance or improper design	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
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					Flaws in aircraft system maintenance process definition - Landing gear components.	377
5					Flaws in manufacturer quality control process - Landing gear components.	376
6					Hard landing	47
7					Bounced landing	118
8					Deep (long) landing	119
9					Descent above desired descent profile	412
10					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
11					Late deceleration and configuration set-up for approach and landing	414
12					DME / ILS DME confusion in assessing the final descent point / FAF	415
13					Unstabilized final approach (high, fast, steep, ...)	416
14					Adverse weather / poor visibility conditions / darkness	6
15					Convective weather / turbulence / windshear or crosswind conditions during take-off	32
16					Lack of adherence to SOP in terms of approach and landing	245
17					Pilot tiredness - Inadequate workload distribution	167
18					Flaws in pilot requirements definition process and/or training methodology	168
19					Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing	246
20					Flaws in CRM training procedures	263
21					Lack of adherence to the main CRM rules	264
22					Incorrect use of automation - FMS	269
23					Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path	248
24					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.	249
25					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

26				Unintuitive and / or error prone system manual - FMS	494
27				Pilot tiredness - Inadequate workload distribution	167
28				Flaws in pilot requirements definition process and/or training methodology	168
29				Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure	250
30				Aggressive maneuvering / overcontrolling	182
31				Lack of adherence to emergency procedures	448
32				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
33				Pilot tiredness - Inadequate workload distribution	167
34				Flaws in pilot requirements definition process and/or training methodology	168
1	17	Design load exceeded	AL19B42	Landing gear/structure is its designed strength but the excessive landing load causes failure	
2				Hard landing	47
3				Lack of adherence to AFM limitations for landing	251
4				Bounced landing	118
5				Deep (long) landing	119
6				Descent above desired descent profile	412
7				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
8				Late deceleration and configuration set-up for approach and landing	414
9				DME / ILS DME confusion in assessing the final descent point / FAF	415
10				Unstabilized final approach (high, fast, steep, ...)	416
11				Adverse weather / poor visibility conditions / darkness	6
12				Convective weather / turbulence / windshear or crosswind conditions during take-off	32
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				Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing	246
17				Flaws in CRM training procedures	263
18				Lack of adherence to the main CRM rules	264
19				Incorrect use of automation - FMS	269
20				Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path	248
21				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.	249
22				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
23				Unintuitive and / or error prone system manual - FMS	494
24				Pilot tiredness - Inadequate workload distribution	167
25				Flaws in pilot requirements definition process and/or training methodology	168
26				Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure	250
27				Aggressive maneuvering / overcontrolling	182
28				Lack of adherence to emergency procedures	448
29				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
30				Pilot tiredness - Inadequate workload distribution	167
V + IV + III + II + I	V	Flight crew fail to maintain control		Flight crew fail to maintain control	
1	18	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	
2				Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown	49
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
8				Lack of adherence to SOP in terms of briefing and checklist before initiating of 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	269
12				Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path	248
13				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.	249
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.	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
21				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 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				Hard landing	47
25				Bounced landing	118
26				Deep (long) landing	119
27				Descent above desired descent profile	412
28				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
29				Late deceleration and configuration set-up for approach and landing	414

29				DME / ILS DME confusion in assessing the final descent point / FAF	415
30				Unstabilized final approach (high, fast, steep, ...)	416
31				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
32				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
33				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
34				Flaws in aircraft system maintenance process definition - Landing gear components.	377
35				Flaws in manufacturer quality control process - Landing gear components.	376
36				Lack of adherence to AFM limitations for landing	251
1	19	Lack of control	AL19B52	The pilot makes no attempt to control the aircraft after suffering structural failure caused by hard landing	
2				Crew is incapable in result of shock related to hard landing	43
3				Pilot tiredness - Inadequate workload distribution	167
4				Flaws in pilot requirements definition process and/or training methodology	168
5				Adverse weather / poor visibility conditions / darkness	6
6				Convective weather / turbulence / wind shear 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
10				Lack of adherence to SOP in terms of briefing and checklist before initiating of 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 supporting systems. Lack of ILS on descent path	248
15				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.	249
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.	295
17				Unintuitive and / or error prone system manual - FMS	494
18				Pilot tiredness - Inadequate workload distribution	167
19				Flaws in pilot requirements definition process and/or training methodology	168
20				Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure	250
21				Aggressive maneuvering / overcontrolling	182
22				Lack of adherence to emergency procedures	448
23				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
24				Pilot tiredness - Inadequate workload distribution	167
25				Flaws in pilot requirements definition process and/or training methodology	168
26				Hard landing	47
27				Bounced landing	118
28				Deep (long) landing	119
29				Descent above desired descent profile	412
30				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
31				Late deceleration and configuration set-up for approach and landing	414
32				DME / ILS DME confusion in assessing the final descent point / FAF	415
33				Unstabilized final approach (high, fast, steep, ...)	416
34				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
35				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
36				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
37				Flaws in aircraft system maintenance process definition - Landing gear components.	377
38				Flaws in manufacturer quality control process - Landing gear components.	376
1	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	
2				Lack of adherence to emergency procedures	448
3				Pilot tiredness - Inadequate workload distribution	167
4				Flaws in pilot requirements definition process and/or training methodology	168
5				Adverse weather / poor visibility conditions / darkness	6
6				Convective weather / turbulence / wind shear 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
10				Lack of adherence to SOP in terms of briefing and checklist before initiating of 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 supporting systems. Lack of ILS on descent path	248
15				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.	249
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.	295
17				Unintuitive and / or error prone system manual - FMS	494
18				Pilot tiredness - Inadequate workload distribution	167
19				Flaws in pilot requirements definition process and/or training methodology	168
20				Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure	250
21				Aggressive maneuvering / overcontrolling	182
22				Lack of adherence to emergency procedures	448
23				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
24				Pilot tiredness - Inadequate workload distribution	167
25				Flaws in pilot requirements definition process and/or training methodology	168
26				Hard landing	47

26				Bounced landing	118
27				Deep (long) landing	119
28				Descent above desired descent profile	412
29				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
30				Late deceleration and configuration set-up for approach and landing	414
31				DME / ILS DME confusion in assessing the final descent point / FAF	415
32				Unstabilized final approach (high, fast, steep, ...)	416
33				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
34				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
35				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
36				Flaws in aircraft system maintenance process definition - Landing gear components.	377
37				Flaws in manufacturer quality control process - Landing gear components.	376
38				Lack of adherence to AFM limitations for landing	251
1	21	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	
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
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
9				Lack of adherence to SOP in terms of briefing and checklist before initiating of 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
13				Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path	248
14				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.	249
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.	295
16				Unintuitive and / or error prone system manual - FMS	494
17				Pilot tiredness - Inadequate workload distribution	167
18				Flaws in pilot requirements definition process and/or training methodology	168
19				Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure	250
20				Aggressive maneuvering / overcontrolling	182
21				Lack of adherence to emergency procedures	448
22				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
23				Pilot tiredness - Inadequate workload distribution	167
24				Flaws in pilot requirements definition process and/or training methodology	168
25				Hard landing	47
26				Bounced landing	118
27				Deep (long) landing	119
28				Descent above desired descent profile	412
29				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
30				Late deceleration and configuration set-up for approach and landing	414
31				DME / ILS DME confusion in assessing the final descent point / FAF	415
32				Unstabilized final approach (high, fast, steep, ...)	416
33				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
34				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
35				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
36				Flaws in aircraft system maintenance process definition - Landing gear components.	377
37				Flaws in manufacturer quality control process - Landing gear components.	376
38				Lack of adherence to AFM limitations for landing	251
VI + I + II + III	VI	Failure to achieve maximum braking		Failure to achieve maximum braking	
1	22	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.	
2				Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate	45
3				Pilot tiredness - Inadequate workload distribution	167
4				Flaws in pilot requirements definition process and/or training methodology	168
5				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
6				Adverse weather / poor visibility conditions / darkness	6
7				Convective weather / turbulence / windshear or crosswind conditions during take-off	32
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
11				Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing	246
12				Flaws in CRM training procedures	263
13				Lack of adherence to the main CRM rules	264
14				Incorrect use of automation - FMS	269
15				Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path	248

16				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.	249
17				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
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
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
1	23	Brakes not functioning correctly	AL19B62	Brakes are not giving maximum braking, i.e. because of improper maintenance and damages	
				Hard landing	47
2				System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)	15
3				Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown	49
4				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
5				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
6				Adverse weather / poor visibility conditions / darkness	6
7				Convective weather / turbulence / windshear or crosswind conditions during take-off	32
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
11				Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing	246
12				Flaws in CRM training procedures	263
13				Lack of adherence to the main CRM rules	264
14				Incorrect use of automation - FMS	269
15				Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path	248
16				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.	249
17				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
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
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
1	24	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	
				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
11				Adverse weather / poor visibility conditions / darkness	6
12				Convective weather / turbulence / windshear or crosswind conditions during take-off	32
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				Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing	246
17				Flaws in CRM training procedures	263
18				Lack of adherence to the main CRM rules	264
19				Incorrect use of automation - FMS	269
20				Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path	248
21				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.	249
22				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
23				Unintuitive and / or error prone system manual - FMS	494
24				Pilot tiredness - Inadequate workload distribution	167
25				Flaws in pilot requirements definition process and/or training methodology	168
26				Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure	250
27				Aggressive maneuvering / overcontrolling	182
28				Lack of adherence to emergency procedures	448
29				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
30				Pilot tiredness - Inadequate workload distribution	167
31				Flaws in pilot requirements definition process and/or training methodology	168
VII + I	VII	Flight crew fail to maintain control		Flight crew fail to maintain control	
1	25	Uncontrollable	AL19B71	No input to controls will allow the flight crew to maintain control of the aircraft after executing a missed approach	
				Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure	250

2				Go-around attempt after thrust reversers deployment	193
3				AOA prevents missed approach	14
4				Adverse weather / poor visibility conditions / darkness	6
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
9				Lack of adherence to SOP in terms of briefing and checklist before initiating of 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
13				Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path	248
14				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.	249
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.	295
16				Unintuitive and / or error prone system manual - FMS	494
1	26	Lack of control	AL19B72	The pilot makes no attempt to control the aircraft after executing a 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
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
9					Lack of adherence to SOP in terms of briefing and checklist before initiating of 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
13					Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path 248
14					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. 249
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. 295
16					Unintuitive and / or error prone system manual - FMS 494
1	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	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
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
9					Lack of adherence to SOP in terms of briefing and checklist before initiating of 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
13					Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path 248
14					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. 249
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. 295
16					Unintuitive and / or error prone system manual - FMS 494
1	28	Insufficient control	AL19B74	The pilot applies correct measures after executing a missed approach but are 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					Lack of adherence to emergency procedures 448
4					Adverse weather / poor visibility conditions / darkness 6
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
9					Lack of adherence to SOP in terms of briefing and checklist before initiating of 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
13					Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path 248
14					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. 249
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. 295
16					Unintuitive and / or error prone system manual - FMS 494
VIII + VII + I		Insufficient fuel available for next approach			
VIII				Insufficient fuel available for next approach	
1	29	Flight crew fail to notify ATC of inadequate reserves	AL19B811	Flight crew do not inform the ATC that the fuel reserve is not sufficient for aircraft to perform the next approach	Continued unstabilized approach (failure to comply with go-around criteria and policy) 13
2					Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure 250
3					Pilot tiredness - Inadequate workload distribution 167
4					Flaws in pilot requirements definition process and/or training methodology 168

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
10				Lack of adherence to SOP in terms of briefing and checklist before initiating of 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 supporting systems. Lack of ILS on descent path	248
15				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.	249
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.	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
25				Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure	250
26				Lack of adherence to emergency procedures	448
27				Go-around attempt after thrust reversers deployment	193
1	30	Poor flight planning	AL1988121	Inadequate amount of reserved fuel in aircraft due to poor flight planning	
2				Pilot tiredness - Inadequate workload distribution	167
3				Flaws in pilot requirements definition process and/or training methodology	168
4				Error in calculation of necessary amount of fuel	243
5				Lack of adherence to SOP in terms of necessary amount of fuel	254
6				Adverse weather / poor visibility conditions / darkness	6
7				Convective weather / turbulence / windshear or crosswind conditions during take-off	32
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
11				Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing	246
12				Flaws in CRM training procedures	263
13				Lack of adherence to the main CRM rules	264
14				Incorrect use of automation - FMS	269
15				Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path	248
16				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.	249
17				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
22				Unintuitive and / or error prone system manual - FMS	494
23				AOA prevents missed approach	14
24				Pilot tiredness - Inadequate workload distribution	167
25				Flaws in pilot requirements definition process and/or training methodology	168
26				Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure	250
27				Lack of adherence to emergency procedures	448
1	31	Aircraft diverted from other location	AL1988122	Aircraft consumes extra fuel during flight due to a route diversion	
2				Convective weather encounter	18
3				Missed approach execution necessary after prolonged flight due to e. g. extreme weather	44
4				Adverse weather / poor visibility conditions / darkness	6
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
9				Lack of adherence to SOP in terms of briefing and checklist before initiating of 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
13				Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path	248
14				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.	249
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.	295
20				Unintuitive and / or error prone system manual - FMS	494
21				AOA prevents missed approach	14
22				Pilot tiredness - Inadequate workload distribution	167
23				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 execution procedure	250
25				Lack of adherence to emergency procedures	448
1	32	Aircraft executes multiple MA	AL19882	Aircraft has already performed one or more missed approach previously, and hence the reserved fuel is not sufficient to perform the next approach	
2				System failure affecting the operation of primary instruments / displays or standby instruments	26
3				Pilot tiredness - Inadequate workload distribution	167
4				Flaws in pilot requirements definition process and/or training methodology	168
5				Adverse weather / poor visibility conditions / darkness	6
6				Adverse weather / poor visibility conditions / darkness	6
7				Convective weather / turbulence / windshear or crosswind conditions during take-off	32
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
11				Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing	246
12				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 supporting systems. Lack of ILS on descent path	248
15				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.	249
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.	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
25				Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure	250
26				Lack of adherence to emergency procedures	448
27				Go-around attempt after thrust reversers deployment	193
1			An abrupt change in wind direction and velocity. A particularly hazardous type is a downburst or microburst	Convective weather encounter	18
2				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 locations (e.g. mountains).	225
		Flight crew fails to detect windshear		Flight crew fails to detect windshear	
1	1	LLWAS not installed	AL23B111	A low-level windshear alert system is not installed at the departure airport	Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.
2				Convective weather encounter	18
3				Frontal surface encounter	64
4				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
1	2	LLWAS not activated	AL23B112	The LLWAS fails to activate, e.g. due to inadequacies in the software used by the system to predict windshear or a failure of the system as a whole	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology
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 - LLWAS system	356
4				Convective weather encounter	18
5				Frontal surface encounter	64
6				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
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
2				Flaws in traffic controller requirements definition process and/or training methodology	145
3				Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared	214
4				Convective weather encounter	18
5				Frontal surface encounter	64
6				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
1	4	PWS not installed	AL23B121	Aircraft does not have a predictive windshear system (PWS) installed	Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System.
2				Convective weather encounter	18
3				Frontal surface encounter	64
4				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
1	5	PWS not activated	AL23B122	PWS fails to activate, e.g. due to inadequacies in the software used by the system to predict windshear or a failure of the system as a whole	System failure affecting the operation of primary instruments / displays or standby instruments
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				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system	253
5				Flaws in manufacturer quality control process - PWS system components	298
6				Convective weather encounter	18
7				Frontal surface encounter	64
8				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
1	6	Crew fail to recognise windshear	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	Pilot tiredness - Inadequate workload distribution
2				Flaws in pilot requirements definition process and/or training methodology	168
3				Convective weather encounter	18
4				Frontal surface encounter	64
5				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
II + I + 0 II		Flight crew fails to execute WEM successfully			Flight crew fails to execute WEM successfully
1	7	Failure to avoid windshear	AL23B21	Windshear is detected by any of the systems available but the aircraft cannot avoid the windshear	not identifiable at that level
2				Convective weather encounter	18
3				Frontal surface encounter	64
4				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				System failure affecting the operation of primary instruments / displays or standby instruments	26
6				Traffic controller tiredness - Inadequate workload distribution	137

7				Flaws in traffic controller requirements definition process and/or training methodology	145
8				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
9				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
10				Pilot tiredness - Inadequate workload distribution	167
11				Flaws in pilot requirements definition process and/or training methodology	168
12				Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared	214
13				Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System.	215
14				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system	253
15				Flaws in manufacturer quality control process - PWS system components	298
16				Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.	355
17				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - LLWAS system	356
1	8	Aircraft too low to execute a WEM	AL23B221	Aircraft is too close to the ground when landing and the windshear encountered is such that is impossible to successfully perform and execute a windshear escape manoeuvre	
2				Convective weather / turbulence / windshear encounter conditions during landing	65
3				Convective weather encounter	18
4				Frontal surface encounter	64
5				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
6				System failure affecting the operation of primary instruments / displays or standby instruments	26
7				Traffic controller tiredness - Inadequate workload distribution	137
8				Flaws in traffic controller requirements definition process and/or training methodology	145
9				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
10				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
11				Pilot tiredness - Inadequate workload distribution	167
12				Flaws in pilot requirements definition process and/or training methodology	168
13				Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared	214
14				Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System.	215
15				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system	253
16				Flaws in manufacturer quality control process - PWS system components	298
17				Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.	355
18				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - LLWAS system	356
1	9	Pilot fails to execute a WEM	AL23B222	Following detection, the flight crew fails to execute and complete a successful windshear escape manoeuvre (WEM)	
2				Pilot tiredness - Inadequate workload distribution	167
3				Flaws in pilot requirements definition process and/or training methodology	168
4				Lack of adherence to emergency procedures - WEM	173
5				Convective weather encounter	18
6				Frontal surface encounter	64
7				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
8				System failure affecting the operation of primary instruments / displays or standby instruments	26
9				Traffic controller tiredness - Inadequate workload distribution	137
10				Flaws in traffic controller requirements definition process and/or training methodology	145
11				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
12				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
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 AIR operations in terms of alerting of flight crew on windshear appeared	214
16				Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System.	215
17				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system	253
18				Flaws in manufacturer quality control process - PWS system components	298
19				Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.	355
20				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - LLWAS system	356
III + II + I + 0 III		Structural failure		Structural failure	
1	10	Structure too weak	AL23B31	Landing gear/ structure is too weak due to manufacturing defect, improper maintenance or improper design	
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				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
5				Flaws in aircraft system maintenance process definition - Landing gear components.	377
6				Flaws in manufacturer quality control process - Landing gear components.	376
7				Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly	116
8				Hard landing	47

8				Bounced landing	118
9				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
10				Late deceleration and configuration set-up for approach and landing	414
11				DME / ILS DME confusion in assessing the final descent point / FAF	415
12				Unstabilized final approach (high, fast, steep, ...)	416
13				Tailwind component above limit	417
14				Convective weather encounter	18
15				Frontal surface encounter	64
16				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
17				System failure affecting the operation of primary instruments / displays or standby instruments	26
18				Traffic controller tiredness - Inadequate workload distribution	137
19				Flaws in traffic controller requirements definition process and/or training methodology	145
20				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
21				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
22				Pilot tiredness - Inadequate workload distribution	167
23				Flaws in pilot requirements definition process and/or training methodology	168
24				Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared	214
25				Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System.	215
26				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system	253
27				Flaws in manufacturer quality control process - PWS system components	298
28				Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.	355
29				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - LLWAS system	356
30				Convective weather / turbulence / windshear encounter conditions during landing	65
31				Pilot tiredness - Inadequate workload distribution	167
32				Flaws in pilot requirements definition process and/or training methodology	168
33				Lack of adherence to emergency procedures - WEM	173
1	11	Design load exceeded	AL23B32	Aircraft is designed correctly but landing load causes failure	116
2				Lack of adherence to AFM limitations for landing	251
3				Hard landing	47
4				Bounced landing	118
5				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
6				Late deceleration and configuration set-up for approach and landing	414
7				DME / ILS DME confusion in assessing the final descent point / FAF	415
8				Unstabilized final approach (high, fast, steep, ...)	416
9				Tailwind component above limit	417
10				Convective weather encounter	18
11				Frontal surface encounter	64
12				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
13				System failure affecting the operation of primary instruments / displays or standby instruments	26
14				Traffic controller tiredness - Inadequate workload distribution	137
15				Flaws in traffic controller requirements definition process and/or training methodology	145
16				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
17				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
18				Pilot tiredness - Inadequate workload distribution	167
19				Flaws in pilot requirements definition process and/or training methodology	168
20				Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared	214
21				Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System.	215
22				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system	253
23				Flaws in manufacturer quality control process - PWS system components	298
24				Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.	355
25				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - LLWAS system	356
26				Convective weather / turbulence / windshear encounter conditions during landing	65
27				Pilot tiredness - Inadequate workload distribution	167
28				Flaws in pilot requirements definition process and/or training methodology	168
29				Lack of adherence to emergency procedures - WEM	173
IV + III + II + I + 0	IV	Flight crew fails to maintain control		Flight crew fails to maintain control	
1	12	Uncontrollable	AL23B41	No input to controls will allow the flight crew to maintain control of the aircraft.	not identifiable at that level
2				Convective weather encounter	18
3				Frontal surface encounter	64
4				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				System failure affecting the operation of primary instruments / displays or standby instruments	26	
6				Traffic controller tiredness - Inadequate workload distribution	137	
7				Flaws in traffic controller requirements definition process and/or training methodology	145	
8				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149	
9				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150	
10				Pilot tiredness - Inadequate workload distribution	167	
11				Flaws in pilot requirements definition process and/or training methodology	168	
12				Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared	214	
13				Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System.	215	
14				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system	253	
15				Flaws in manufacturer quality control process - PWS system components	298	
16				Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.	355	
17				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - LLWAS system	356	
18				Convective weather / turbulence / windshear encounter conditions during landing	65	
19				Pilot tiredness - Inadequate workload distribution	167	
20				Flaws in pilot requirements definition process and/or training methodology	168	
21				Lack of adherence to emergency procedures - WEM	173	
22				Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly	116	
23				Hard landing	47	
24				Bounced landing	118	
25				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	
26				Late deceleration and configuration set-up for approach and landing	414	
27				DME / ILS DME confusion in assessing the final descent point / FAF	415	
28				Unstabilized final approach (high, fast, steep, ...)	416	
29				Tailwind component above limit	417	
30				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358	
31				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149	
32				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150	
33				Flaws in aircraft system maintenance process definition - Landing gear components.	377	
34				Flaws in manufacturer quality control process - Landing gear components.	376	
35				Lack of adherence to AFM limitations for landing	251	
1	13	Lack of control	AL23B42	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					Convective weather encounter	18
5					Frontal surface encounter	64
6					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
7					System failure affecting the operation of primary instruments / displays or standby instruments	26
8					Traffic controller tiredness - Inadequate workload distribution	137
9					Flaws in traffic controller requirements definition process and/or training methodology	145
10					Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
11					Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
12					Pilot tiredness - Inadequate workload distribution	167
13					Flaws in pilot requirements definition process and/or training methodology	168
14					Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared	214
15					Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System.	215
16					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system	253
17					Flaws in manufacturer quality control process - PWS system components	298
18					Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.	355
19					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - LLWAS system	356
20					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	168
23					Lack of adherence to emergency procedures - WEM	173
24					Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly	116
25					Hard landing	47
26					Bounced landing	118
27					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
28					Late deceleration and configuration set-up for approach and landing	414
29					DME / ILS DME confusion in assessing the final descent point / FAF	415
30					Unstabilized final approach (high, fast, steep, ...)	416
31					Tailwind component above limit	417
32					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
33					Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149

34				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
35				Flaws in aircraft system maintenance process definition - Landing gear components.	377
36				Flaws in manufacturer quality control process - Landing gear components.	376
37				Lack of adherence to AFM limitations for landing	251
1	14	Incorrect Control	AL23B43	The pilot applies incorrect control to the aircraft. This can be due to improper training, stress and fatigue	
2				Pilot tiredness - Inadequate workload distribution	167
3				Flaws in pilot requirements definition process and/or training methodology	168
4				Lack of adherence to emergency procedures	448
5				Convective weather encounter	18
				Frontal surface encounter	64
6				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
7				System failure affecting the operation of primary instruments / displays or standby instruments	26
8				Traffic controller tiredness - Inadequate workload distribution	137
9				Flaws in traffic controller requirements definition process and/or training methodology	145
10				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
11				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
12				Pilot tiredness - Inadequate workload distribution	167
13				Flaws in pilot requirements definition process and/or training methodology	168
14				Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared	214
15				Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System.	215
16				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system	253
17				Flaws in manufacturer quality control process - PWS system components	298
18				Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.	355
19				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - LLWAS system	356
20				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	168
23				Lack of adherence to emergency procedures - WEM	173
24				Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly	116
25				Hard landing	47
26				Bounced landing	118
27				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
28				Late deceleration and configuration set-up for approach and landing	414
29				DME / ILS DME confusion in assessing the final descent point / FAF	415
30				Unstabilized final approach (high, fast, steep, ...)	416
31				Tailwind component above limit	417
32				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
33				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
34				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
35				Flaws in aircraft system maintenance process definition - Landing gear components.	377
36				Flaws in manufacturer quality control process - Landing gear components.	376
37				Lack of adherence to AFM limitations for landing	251
1	15	Insufficient control	AL23B44	The pilot applies correct measures but are not enough to prevent aircraft leaving off the side of the runway	
2				Pilot tiredness - Inadequate workload distribution	167
3				Flaws in pilot requirements definition process and/or training methodology	168
4				Lack of adherence to emergency procedures	448
5				Convective weather encounter	18
				Frontal surface encounter	64
6				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
7				System failure affecting the operation of primary instruments / displays or standby instruments	26
8				Traffic controller tiredness - Inadequate workload distribution	137
9				Flaws in traffic controller requirements definition process and/or training methodology	145
10				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
11				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
12				Pilot tiredness - Inadequate workload distribution	167
13				Flaws in pilot requirements definition process and/or training methodology	168
14				Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared	214
15				Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System.	215
16				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system	253
17				Flaws in manufacturer quality control process - PWS system components	298
18				Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.	355
19				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - LLWAS system	356
20				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	168
23				Lack of adherence to emergency procedures - WEM	173
24				Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly	116

25				Hard landing	47
26				Bounced landing	118
27				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
28				Late deceleration and configuration set-up for approach and landing	414
29				DME / ILS DME confusion in assessing the final descent point / FAF	415
30				Unstabilized final approach (high, fast, steep, ...)	416
31				Tailwind component above limit	417
32				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
33				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
34				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
35				Flaws in aircraft system maintenance process definition - Landing gear components.	377
36				Flaws in manufacturer quality control process - Landing gear components.	376
37				Lack of adherence to AFM limitations for landing	251
V + II + I + 0 V					
				Failure to achieve maximum braking	
1	16	Insufficient runway length	AL23B51	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.	
2				Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate	45
3				Pilot tiredness - Inadequate workload distribution	167
4				Flaws in pilot requirements definition process and/or training methodology	168
5				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
6				Bounced landing	118
7				Deep (long) landing	119
8				Descent above desired descent profile	412
9				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
10				Late deceleration and configuration set-up for approach and landing	414
11				DME / ILS DME confusion in assessing the final descent point / FAF	415
12				Unstabilized final approach (high, fast, steep, ...)	416
13				Tailwind component above limit	417
14				Convective weather encounter	18
15				Frontal surface encounter	64
16				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
17				System failure affecting the operation of primary instruments / displays or standby instruments	26
18				Traffic controller tiredness - Inadequate workload distribution	137
19				Flaws in traffic controller requirements definition process and/or training methodology	145
20				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
21				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
22				Pilot tiredness - Inadequate workload distribution	167
23				Flaws in pilot requirements definition process and/or training methodology	168
24				Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared	214
25				Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System.	215
26				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system	253
27				Flaws in manufacturer quality control process - PWS system components	298
28				Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.	355
29				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - LLWAS system	356
30				Convective weather / turbulence / windshear encounter conditions during landing	65
31				Pilot tiredness - Inadequate workload distribution	167
32				Flaws in pilot requirements definition process and/or training methodology	168
1	17	Brakes not functioning correctly	AL23B52	Brakes are not giving maximum braking, i.e. because of improper maintenance and damages	
2				Hard landing	47
3				System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)	15
4				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
5				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
6				Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown	49
7				Bounced landing	118
8				Deep (long) landing	119
9				Descent above desired descent profile	412
10				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
11				Late deceleration and configuration set-up for approach and landing	414
12				DME / ILS DME confusion in assessing the final descent point / FAF	415
13				Unstabilized final approach (high, fast, steep, ...)	416
14				Tailwind component above limit	417
15				Convective weather encounter	18
				Frontal surface encounter	64

16				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
17				System failure affecting the operation of primary instruments / displays or standby instruments	26
18				Traffic controller tiredness - Inadequate workload distribution	137
19				Flaws in traffic controller requirements definition process and/or training methodology	145
20				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
21				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
22				Pilot tiredness - Inadequate workload distribution	167
23				Flaws in pilot requirements definition process and/or training methodology	168
24				Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared	214
25				Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System.	215
26				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system	253
27				Flaws in manufacturer quality control process - PWS system components	298
28				Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.	355
29				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - LLWAS system	356
30				Convective weather / turbulence / windshear encounter conditions during landing	65
31				Pilot tiredness - Inadequate workload distribution	167
32				Flaws in pilot requirements definition process and/or training methodology	168
33				Lack of adherence to emergency procedures - WEM	173
1	18	Brakes not applied correctly	AL23B53	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	
2				Failure to arm ground-spoilers	177
3				Inappropriate selection of autobrake mode for given runway length and condition	178
4				Late thrust reduction or power-on touchdown	176
5				Delayed selection of reverse thrust	175
6				Late activation of pedal braking or takeover from autobrake, when so required	174
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 in terms of approach and landing	245
10				Flaws in CRM training procedures	263
11				Lack of adherence to the main CRM rules	264
12				Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly	116
13				Hard landing	47
14				Bounced landing	118
15				Deep (long) landing	119
16				Descent above desired descent profile	412
17				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
18				Late deceleration and configuration set-up for approach and landing	414
19				DME / ILS DME confusion in assessing the final descent point / FAF	415
20				Unstabilized final approach (high, fast, steep, ...)	416
21				Tailwind component above limit	417
22				Convective weather encounter	18
23				Frontal surface encounter	64
24				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
25				System failure affecting the operation of primary instruments / displays or standby instruments	26
26				Traffic controller tiredness - Inadequate workload distribution	137
27				Flaws in traffic controller requirements definition process and/or training methodology	145
28				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
29				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
30				Pilot tiredness - Inadequate workload distribution	167
31				Flaws in pilot requirements definition process and/or training methodology	168
32				Lack of adherence to SOP for AIR operations in terms of alerting of flight crew on windshear appeared	214
33				Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of PWS System.	215
34				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - PWS system	253
35				Flaws in manufacturer quality control process - PWS system components	298
36				Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.	355
37				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - LLWAS system	356
38				Convective weather / turbulence / windshear encounter conditions during landing	65
39				Pilot tiredness - Inadequate workload distribution	167
40				Flaws in pilot requirements definition process and/or training methodology	168
1		Aircraft handling by crew during flare inappropriate		Lack of adherence to emergency procedures - WEM	173
1	1	Loss of lift during flare	AL25B11	Adverse weather conditions or sudden wind gusts cause the aircraft to lose lift and touchdown hard	
2				Aircraft handling by crew during flare inappropriate	
3				Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly	116
2				Convective weather / turbulence / windshear or crosswind conditions during take-off	32
3				Tailwind component above limit	417
2				Pilot tiredness - Inadequate workload distribution	167
3				Flaws in pilot requirements definition process and/or training methodology	168
4				Convective weather encounter	18
5				Continued unstabilized approach (failure to comply with go-around criteria and policy)	13

6				Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly	116
7				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
8				Late deceleration and configuration set-up for approach and landing	414
9				Unstabilized final approach (high, fast, steep, ...)	416
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	245
13				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
1	3	PF flares too soon	AL25B13	Flight crew flare too soon so that the increase in angle of attack increases the drag and hence decreases the speed of the aircraft, which may cause the aircraft to stall and touchdown hard.	
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 in terms of approach and landing	245
1	4	PF handling incorrect	AL25B14	Flight crew fail to correctly flare the aircraft, then it is likely that 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-rotated	
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 in terms of approach and landing	245
5				Aggressive maneuvering / overcontrolling	182
6				Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly	116
II + I	II	Structural failure		Structural failure	
1	5	Structure too weak	AL25B21	Landing gear/ structure is too weak due to manufacturing defect, improper maintenance or improper design	
2				Hard landing	47
3				Bounced landing	118
4				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
5				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
6				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
7				Flaws in aircraft system maintenance process definition - Landing gear components.	377
8				Flaws in manufacturer quality control process - Landing gear components.	376
9				Convective weather encounter	18
10				Continued unstabilized approach (failure to comply with go-around criteria and policy)	13
11				Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly	116
12				Convective weather / turbulence / windshear or crosswind conditions during take-off	32
13				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
14				Late deceleration and configuration set-up for approach and landing	414
15				Unstabilized final approach (high, fast, steep, ...)	416
16				Tailwind component above limit	417
17				Long / floating flare	426
18				Lack of adherence to SOP in terms of approach and landing	245
19				Pilot tiredness - Inadequate workload distribution	167
20				Flaws in pilot requirements definition process and/or training methodology	168
21				Aggressive maneuvering / overcontrolling	182
22				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
1	6	Design load exceeded	AL25B22	Aircraft is designed correctly but landing load causes failure	
2				Hard landing	47
3				Bounced landing	118
4				Convective weather encounter	18
5				Continued unstabilized approach (failure to comply with go-around criteria and policy)	13
6				Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly	116
7				Convective weather / turbulence / windshear or crosswind conditions during take-off	32
8				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
9				Late deceleration and configuration set-up for approach and landing	414
10				Unstabilized final approach (high, fast, steep, ...)	416
11				Tailwind component above limit	417
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
17				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
III + II + I	III	Flight crew fails to maintain control		Flight crew fails to maintain control	
1	7	Uncontrollable	AL25B31	No input to controls will allow the flight crew to maintain control of the aircraft.	
2				none	
3				Convective weather encounter	18
4				Continued unstabilized approach (failure to comply with go-around criteria and policy)	13
5				Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly	116
6				Convective weather / turbulence / windshear or crosswind conditions during take-off	32

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, 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
15				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
16				Hard landing	47
17				Bounced landing	118
18				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
19				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
20				Maintenance technician / airworthiness specialist tiredness - Inadequate workload 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
1	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				Convective weather encounter	18
5				Continued unstabilized approach (failure to comply with go-around criteria and policy)	13
6				Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly	116
7				Convective weather / turbulence / windshear or crosswind conditions during take-off	32
8				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
9				Late deceleration and configuration set-up for approach and landing	414
10				Unstabilized final approach (high, fast, steep, ...)	416
11				Tailwind component above limit	417
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
17				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
18				Hard landing	47
19				Bounced landing	118
20				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
21				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
22				Maintenance technician / airworthiness specialist tiredness - Inadequate workload 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
1	9 Incorrect Control	AL25B33	The pilot applies incorrect control to the aircraft. This can be due to 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				Continued unstabilized approach (failure to comply with go-around criteria and policy)	13
6				Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly	116
7				Convective weather / turbulence / windshear or crosswind conditions during take-off	32
8				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
9				Late deceleration and configuration set-up for approach and landing	414
10				Unstabilized final approach (high, fast, steep, ...)	416
11				Tailwind component above limit	417
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
17				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
18				Hard landing	47
19				Bounced landing	118
20				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
21				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
22				Maintenance technician / airworthiness specialist tiredness - Inadequate workload 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
1	10 Insufficient control	AL25B34	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
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				Continued unstabilized approach (failure to comply with go-around criteria and policy)	13
6				Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly	116
7				Convective weather / turbulence / windshear or crosswind conditions during take-off	32
8				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
9				Late deceleration and configuration set-up for approach and landing	414
10				Unstabilized final approach (high, fast, steep, ...)	416
11				Tailwind component above limit	417
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
17				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
18				Hard landing	47
19				Bounced landing	118
20				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
21				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
22				Maintenance technician / airworthiness specialist tiredness - Inadequate workload 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
I	Aircraft handling by flight crew during landing roll inappropriate			Aircraft handling by flight crew during landing roll inappropriate	
1	1 Directional handling failure	AL26B11	Flight crew applies inappropriate directional handling that affects the directional stability of the aircraft during the landing roll	Temporary loss of directional control during rollout	120
2				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
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
1	2 Braking application failure	AL26B12	Flight crew applies inappropriate braking during the landing roll	Failure to arm ground-spoilers	177
2				Inappropriate selection of autobrake mode for given runway length and condition	178
3				Delayed selection of reverse thrust	175
4				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
1	3 Thrust reverser application failure	AL26B13	Thrust levers are set incorrectly such that the application of reverse thrusters creates asymmetric thrust that affects the directional stability of the aircraft during the landing roll	Lack of adherence to SOP in terms of approach and landing	245
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 in terms of briefing and checklist before initiating of approach and landing	246
5				Flaws in CRM training procedures	263
6				Lack of adherence to the main CRM rules	264
7				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 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				Convective weather encounter	18
3				Adverse weather / poor visibility conditions / darkness	6
II + I	II Flight crew fails to maintain control			Flight crew fails to maintain control	
1	5 Uncontrollable	AL26B21	No input to controls will allow the flight crew to maintain control of the aircraft.	none	
2				Convective weather encounter	18
3				Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly	116
4				Temporary loss of directional control during rollout	120
5				Adverse weather / poor visibility conditions / darkness	6
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, vectors, altitude or speed restrictions, ...)	413
7				Late deceleration and configuration set-up for approach and landing	414
8				Failure to remember / assess crosswind component limit for prevailing runway condition	418
9				Inappropriate selection of autobrake mode for given runway length and condition	178
10				Inadequate crosswind landing / decrab technique	425
11				Touchdown off centerline	427
12				Delayed selection of reverse thrust	175
13				Inappropriate use of differential reverse thrust	430
14				Late activation of pedal braking or takeover from autobrake, when so required	174
15				Inadequate use of differential braking	432
16				Use of nose wheel steering tiller during rollout	433
17				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				Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing	246

21				Flaws in CRM training procedures	263
22				Lack of adherence to the main CRM rules	264
23				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
1	6 Lack of control	AL26B22	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				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
8				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
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				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				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 approach and landing	246
23				Flaws in CRM training procedures	263
24				Lack of adherence to the main CRM rules	264
25				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
1	7 Incorrect Control	AL26B23	The pilot applies incorrect control to the aircraft. This can be due to 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
8				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
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				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				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 approach and landing	246
23				Flaws in CRM training procedures	263
24				Lack of adherence to the main CRM rules	264
25				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
1	8 Insufficient control	AL26B24	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
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
8				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
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				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				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 approach and landing	246
23				Flaws in CRM training procedures	263
24				Lack of adherence to the main CRM rules	264

25				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
III + II + I					
	III	Failure to achieve maximum braking		Failure to achieve maximum braking	
1	9	Insufficient Runway Length	AL26B31	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.	45
2				Pilot tiredness - Inadequate workload distribution	167
3				Flaws in pilot requirements definition process and/or training methodology	168
4				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
5				Convective weather encounter	18
6				Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly	116
7				Temporary loss of directional control during rollout	120
8				Adverse weather / poor visibility conditions / darkness	6
9				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
10				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				Inadequate crosswind landing / decrab technique	425
14				Touchdown off centerline	427
15				Delayed selection of reverse thrust	175
16				Inappropriate use of differential reverse thrust	430
17				Late activation of pedal braking or takeover from autobrake, when so required	174
18				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	168
23				Lack of adherence to SOP in terms of briefing and checklist before initiating of 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 or / and passive contribution to the PF duties	151
27				Pilot tiredness - Inadequate workload distribution	167
28				Flaws in pilot requirements definition process and/or training methodology	168
29				Lack of adherence to emergency procedures	448
1	10	Brakes not functioning correctly	AL26B32	Brakes are not giving maximum braking, i.e. because of improper maintenance and damages	15
2				System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)	
3				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
4				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
5				Convective weather encounter	18
6				Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly	116
7				Temporary loss of directional control during rollout	120
8				Adverse weather / poor visibility conditions / darkness	6
9				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
10				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				Inadequate crosswind landing / decrab technique	425
14				Touchdown off centerline	427
15				Delayed selection of reverse thrust	175
16				Inappropriate use of differential reverse thrust	430
17				Late activation of pedal braking or takeover from autobrake, when so required	174
18				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	168
23				Lack of adherence to SOP in terms of briefing and checklist before initiating of 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 or / and passive contribution to the PF duties	151
27				Pilot tiredness - Inadequate workload distribution	167
28				Flaws in pilot requirements definition process and/or training methodology	168
29				Lack of adherence to emergency procedures	448
1	11	Brakes not applied correctly	AL26B33	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	177
2				Failure to arm ground-spoilers	
3				Inappropriate selection of autobrake mode for given runway length and condition	178
4				Late thrust reduction or power-on touchdown	176
5				Delayed selection of reverse thrust	175
6				Late activation of pedal braking or takeover from autobrake, when so required	174
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
10				Flaws in CRM training procedures	263
11				Lack of adherence to the main CRM rules	264
12				Convective weather encounter	18
13				Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly	116

13				Temporary loss of directional control during rollout	120
14				Adverse weather / poor visibility conditions / darkness	6
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
17				Failure to remember / assess crosswind component limit for prevailing runway condition	418
18				Inappropriate selection of autobrake mode for given runway length and condition	178
19				Inadequate crosswind landing / decrab technique	425
20				Touchdown off centerline	427
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				Lack of adherence to SOP in terms of approach and landing	245
27				Pilot tiredness - Inadequate workload distribution	167
28				Flaws in pilot requirements definition process and/or training methodology	168
29				Lack of adherence to SOP in terms of briefing and checklist before initiating of approach and landing	246
30				Flaws in CRM training procedures	263
31				Lack of adherence to the main CRM rules	264
32				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
33				Pilot tiredness - Inadequate workload distribution	167
34				Flaws in pilot requirements definition process and/or training methodology	168
35				Lack of adherence to emergency procedures	448
	I	Aircraft directional control related systems failure		Aircraft directional control related systems failure	
1	1	Landing gear extension failure	AL27B111	Any failure of the landing gear to extend or remain extended	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				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
5				Flaws in aircraft system maintenance process definition - Landing gear components.	377
1	2	Landing gear structure too weak	AL27B112	Failure due to the presence of a crack or similar defect in the landing gear	26
2				Flaws in manufacturer quality control process - Landing gear components.	376
3				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
4				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
1	3	Foreign object damage to landing gear	AL27B113	A foreign object strikes and damages the landing gear, including debris on runway and birds	80
2				Tire burst	39
3				Contaminated Runway	34
4				Bird strike	5
6				Wildlife incursion	216
7				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	162
8				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	129
9				Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	130
1	4	Landing gear failure due to inadequate maintenance	AL27B114	Maintenance fail to service the gear or service the gear incorrectly	377
2				Flaws in aircraft system maintenance process definition - Landing gear components.	149
3				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	150
4				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	358
1	5	Landing gear failure due to inadequate design	AL27B115	Design of the gear is inadequate and this design flaw directly causes the failure of the gear	26
2				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	377
3				System failure affecting the operation of primary instruments / displays or standby instruments	149
4				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	150
5				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	80
1	6	Wheel structure too weak	AL27B121	Failure due to the presence of a crack or similar defect in any part of the wheel system	80
2				Tire burst	39
3				Contaminated Runway	34
4				Bird strike	5
5				Wildlife incursion	401
6				Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	216
7				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	162
8				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	129
9				Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	130
1	7	Foreign object damage to wheels	AL27B122	A foreign object strikes and damages the wheels, including debris on runway and birds	80
2				Tire burst	39
3				Contaminated Runway	34
4				Bird strike	5
5				Wildlife incursion	401
6				Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	216
7				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	162
8				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	129
9				Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	130
1	8	Wheel failure due to inadequate maintenance	AL27B123	Maintenance fail to service the wheels or service the wheels incorrectly	377
2				Flaws in aircraft system maintenance process definition - Landing gear components.	149
3				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	150
				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150

1	9	Wheel system failure	AL27B124	A malfunction causes the wheels to lock (brake malfunction)	Tire burst	80
2					Contaminated Runway	39
3					System failure affecting the operation of primary instruments / displays or standby instruments	26
4					Wildlife incursion	5
5					Flaws in aircraft system maintenance process definition - Landing gear components.	377
6					Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
7					Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
8					Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401
9					Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216
10					Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129
11					Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130
1	10	Wheel failure due to inadequate design	AL27B125	Design of any part of the wheel system is inadequate and this design flaw directly causes the failure of any part of the wheel	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
II + I	II	Flight crew fails to maintain control			Flight crew fails to maintain control	
1	11	Uncontrollable	AL27B21	No input to controls will allow the flight crew to maintain control of the aircraft.	not identifiable at the moment	
2					Tire burst	80
3					Contaminated Runway	39
4					Bird strike	34
5					System failure affecting the operation of primary instruments / displays or standby instruments	26
6					Wildlife incursion	5
7					Flaws in aircraft system maintenance process definition - Landing gear components.	377
8					Flaws in manufacturer quality control process - Landing gear components.	376
9					Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
10					Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
11					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 integrity monitoring	401
13					Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216
14					Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162
15					Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129
16					Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130
1	12	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					Bird strike	34
7					System failure affecting the operation of primary instruments / displays or standby 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
11					Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
12					Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
13					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
14					Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401
15					Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216
16					Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162
17					Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129
18					Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130
1	13	Incorrect Control	AL27B23	The pilot applies incorrect control to the aircraft. This can be due to 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					Tire burst	80
5					Contaminated Runway	39
6					Bird strike	34
7					System failure affecting the operation of primary instruments / displays or standby 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
11					Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
12					Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
13					Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358

14				Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401
15				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216
16				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162
17				Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129
18				Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130
1	14	Insufficient control	AL27B24	The pilot applies correct measures but are not enough to prevent aircraft leaving off the side of the runway	
2				Pilot tiredness - Inadequate workload distribution	167
3				Flaws in pilot requirements definition process and/or training methodology	168
4				Lack of adherence to emergency procedures	448
5				Tire burst	80
6				Contaminated Runway	39
7				Bird strike	34
8				System failure affecting the operation of primary instruments / displays or standby instruments	26
9				Wildlife incursion	5
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 maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
13				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
14				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
15				Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401
16				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216
17				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162
18				Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129
19				Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130

Base events		Code	Definition	Identifiable precursors	No.
ESD1	Base events	Code	Definition	Identifiable precursors	No.
1	Aircraft System Failure			Aircraft System Failure	
1	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	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				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 (autopilot incl.)	306
6				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine	316
7				Flaws in manufacturer quality control process - Autothrottle system in the engine.	324
8				Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.	325
9				Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)	410
1	2 Communications Failure	TO01B12	Failure of any communications equipment such that the crew are unable to communicate with ATC	Prolonged loss of communications (PLOC) between pilot and controller(s)	53
2				Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll	98
3				Lack of or poor communication quality	146
4				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
5				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
6				Flaws in aircraft system maintenance process definition - Communication equipment systems and components.	270
7				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.	271
8				Flaws in manufacturer quality control process - Communication equipment systems and components.	272
1	3 Electrical Power Failure	TO01B13	Failure of any of the power supplies such that any critical system fails	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				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components	230
5				Flaws in manufacturer quality control process - Power supply system components	238
6				Flaws in aircraft system maintenance process definition - Power supply system components	387
1	4 Fire Protection Failure	TO01B14	Failure of the system designed to warn of and extinguish any fire within the aircraft.	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				Flaws in aircraft system maintenance process definition - Fire detection system components	474
5				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire detection system components	475
6				Flaws in manufacturer quality control process - Fire detection system components	476
7				Flaws in aircraft system maintenance process definition - Fire warning system	477
8				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system	478
9				Flaws in manufacturer quality control process - Fire warning system	479
10				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components	480
11				Flaws in aircraft system maintenance process definition - Fire extinguishing system components	481
12				Flaws in manufacturer quality control process - Fire extinguishing system components	482
1	5 Hydraulic Power Failure	TO01B15	Failure of any of the hydraulic systems	System failure affecting aircraft configuration, controllability and/or flying qualities	25
2				Landing gear retraction failure	63
3				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
4				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
5				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components	333
6				Flaws in aircraft system maintenance process definition - Hydraulic System	334
7				Flaws in manufacturer quality control process -Hydraulic system components.	386
1	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	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

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
5				Flaws in aircraft system maintenance process definition - other critical flight instruments and systems.	383
1	7 Navigation System Failure	TO01B17	Failure of any of the navigation systems	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				Navigation deviation	317
5				Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491
6				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492
7				Flaws in manufacturer quality control process - Onboard navigational systems and components.	493
1	8 Auxiliary Power Unit Failure	TO01B18	Failure of a critical part of the APU leading to failure of the APU itself	System failure affecting aircraft configuration, controllability and/or flying qualities	25
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				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components	464
5				Flaws in manufacturer quality control process - APU systems and / or components	465
6				Flaws in aircraft system maintenance process definition - APU systems and / or components	466
1	9 Flap Systems Failure	TO01B19	Failure of flap systems	System failure affecting aircraft configuration, controllability and/or flying qualities	25
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				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.	288
5				Flaws in aircraft system maintenance process definition - Components of Wing control surface system.	311
6				Flaws in manufacturer quality control process - Components of Wing control surface system.	314
1	10 Drag Control Systems Failure	TO01B110	Failure of drag control systems	System failure affecting aircraft configuration, controllability and/or flying qualities	25
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				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Drag control system components.	381
5				Flaws in aircraft system maintenance process definition - Drag control system components.	379
6				Flaws in manufacturer quality control process - Drag control system components.	378
1	11 Landing Gear Systems Failure	TO01B111	Failure of landing gear systems	System failure affecting aircraft configuration, controllability and/or flying qualities	25
2				Landing gear retraction failure	63
3				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
4				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
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
1	12 Pneumatic Systems Failure	TO01B112	Failure of pneumatic systems	System failure affecting the operation of primary instruments / displays or standby instruments	26
2				Engine failure	77
3				Cabin pressure drop as a result of pneumatic system failure	79
4				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
5				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
6				Inadequate aircraft de-icing / anti-icing	180
7				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Pneumatic system components.	375
8				Flaws in aircraft system maintenance process definition - Pneumatic system components.	374
9				Flaws in manufacturer quality control process - Pneumatic system components.	373
1	13 Door Systems Failure	TO01B113	Failure of door systems	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				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components	391
6				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components	391

	Base events	Code	Definition	Identifiable precursors	No.
1	14 Other Systems Failures	TO01B114	Failure of other systems that may cause take-off rejection	System failure affecting aircraft configuration, controllability and/or flying qualities	25
2				System failure affecting the operation of primary instruments / displays or standby instruments	26
3				Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll	98
4				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
5				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
6				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - other critical flight instruments and systems.	385
7				Flaws in aircraft system maintenance process definition - other critical flight instruments and systems.	383
II + I	II Take-off Rejection by Flight Crew			Take-off Rejection by Flight Crew	
1	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		
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, failure recognition and preparedness	209
5				System failure affecting aircraft configuration, controllability and/or flying qualities	25
6				System failure affecting the operation of primary instruments / displays or standby instruments	26
7				Prolonged loss of communications (PLOC) between pilot and controller(s)	53
8				Landing gear retraction failure	63
9				Engine failure	77
10				Cabin pressure drop as a result of pneumatic system failure	79
11				Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll	98
12				Lack of or poor communication quality	146
13				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
14				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
15				Inadequate aircraft de-icing / anti-icing	180
16				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components	230
17				Flaws in manufacturer quality control process - Power supply system components	238
18				Flaws in aircraft system maintenance process definition - Communication equipment systems and components.	270
19				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.	271
20				Flaws in manufacturer quality control process - Communication equipment systems and components.	272
21				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.	288
22				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299
23				Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)	306
24				Flaws in aircraft system maintenance process definition - Components of Wing control surface system.	311
25				Flaws in manufacturer quality control process - Components of Wing control surface system.	314
26				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine	316
27				Navigation deviation	317
28				Flaws in manufacturer quality control process - Autothrottle system in the engine.	324
29				Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.	325
30				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components	333
31				Flaws in aircraft system maintenance process definition - Hydraulic System	334
32				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
33				Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)	410
34				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components	464
35				Flaws in aircraft system maintenance process definition - APU systems and / or components	466
36				Flaws in aircraft system maintenance process definition - Fire detection system components	474
37				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components	475
38				Flaws in manufacturer quality control process - Fire detection system components	476
39				Flaws in aircraft system maintenance process definition - Fire warning system	477
40				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

	Base events	Code	Definition	Identifiable precursors	No.
41				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components	480
42				Flaws in aircraft system maintenance process definition - Fire extinguishing system components	481
43				Flaws in manufacturer quality control process - Fire extinguishing system components	482
44				Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491
45				Inadequate certification process and / or flaws in methodology concerning verification 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				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components	391
49				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components	391
50				Flaws in aircraft system maintenance process definition - Power supply system components	387
51				Flaws in manufacturer quality control process -Hydraulic system components.	386
52				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - other critical flight instruments and systems.	385
53				Flaws in aircraft system maintenance process definition - other critical flight instruments and systems.	383
55				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Drag control system components.	381
56				Flaws in aircraft system maintenance process definition - Drag control system components.	379
57				Flaws in manufacturer quality control process - Drag control system components.	378
58				Flaws in aircraft system maintenance process definition - Landing gear components.	377
59				Flaws in manufacturer quality control process - Landing gear components.	376
60				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Pneumatic system components.	375
61				Flaws in aircraft system maintenance process definition - Pneumatic system components.	374
62				Flaws in manufacturer quality control process - Pneumatic system components.	373
1	16 Pilot Misjudgement	TO01B212	The pilot diagnoses the aircraft system failure but 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				System failure affecting the operation of primary instruments / displays or standby instruments	26
6				Prolonged loss of communications (PLOC) between pilot and controller(s)	53
7				Landing gear retraction failure	63
8				Engine failure	77
9				Cabin pressure drop as a result of pneumatic system failure	79
10				Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll	98
11				Lack of or poor communication quality	146
12				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
13				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
14				Inadequate aircraft de-icing / anti-icing	180
15				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components	230
16				Flaws in manufacturer quality control process - Power supply system components	238
17				Flaws in aircraft system maintenance process definition - Communication equipment systems and components.	270
18				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.	271
19				Flaws in manufacturer quality control process - Communication equipment systems and components.	272
20				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.	288
21				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299
22				Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)	306
23				Flaws in aircraft system maintenance process definition - Components of Wing control surface system.	311
24				Flaws in manufacturer quality control process - Components of Wing control surface system.	314
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				Navigation deviation	317
27				Flaws in manufacturer quality control process - Autothrottle system in the engine.	324
28				Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.	325

	Base events	Code	Definition	Identifiable precursors	No.
29				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components	333
30				Flaws in aircraft system maintenance process definition - Hydraulic System	334
31				Inadequate certification process and / or flaws in methodology concerning verification 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
33				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components	464
34				Flaws in aircraft system maintenance process definition - APU systems and / or components	466
35				Flaws in aircraft system maintenance process definition - Fire detection system components	474
36				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system 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
39				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system	478
40				Flaws in manufacturer quality control process - Fire warning system	479
41				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components	480
42				Flaws in aircraft system maintenance process definition - Fire extinguishing system components	481
43				Flaws in manufacturer quality control process - Fire extinguishing system components	482
44				Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491
45				Inadequate certification process and / or flaws in methodology concerning verification 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				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components	391
49				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components	391
50				Flaws in aircraft system maintenance process definition - Power supply system components	387
51				Flaws in manufacturer quality control process -Hydraulic system components.	386
52				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - other critical flight instruments and systems.	385
53				Flaws in aircraft system maintenance process definition - other critical flight instruments and systems.	383
55				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Drag control system components.	381
56				Flaws in aircraft system maintenance process definition - Drag control system components.	379
57				Flaws in manufacturer quality control process - Drag control system components.	378
58				Flaws in aircraft system maintenance process definition - Landing gear components.	377
59				Flaws in manufacturer quality control process - Landing gear components.	376
60				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Pneumatic system components.	375
61				Flaws in aircraft system maintenance process definition - Pneumatic system components.	374
62				Flaws in manufacturer quality control process - Pneumatic system components.	373
1	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	not identifiable at that level	
2				System failure affecting aircraft configuration, controllability and/or flying qualities	25
3				System failure affecting the operation of primary instruments / displays or standby instruments	26
4				Prolonged loss of communications (PLOC) between pilot and controller(s)	53
5				Landing gear retraction failure	63
6				Engine failure	77
7				Cabin pressure drop as a result of pneumatic system failure	79
8				Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll	98
9				Lack of or poor communication quality	146
10				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
11				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
12				Inadequate aircraft de-icing / anti-icing	180
13				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components	230
14				Flaws in manufacturer quality control process - Power supply system components	238
15				Flaws in aircraft system maintenance process definition - Communication equipment systems and components.	270

	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
17				Flaws in manufacturer quality control process - Communication equipment systems and components.	272
18				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.	288
19				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299
20				Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)	306
21				Flaws in aircraft system maintenance process definition - Components of Wing control surface system.	311
22				Flaws in manufacturer quality control process - Components of Wing control surface system.	314
23				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine	316
24				Navigation deviation	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
27				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components	333
28				Flaws in aircraft system maintenance process definition - Hydraulic System	334
29				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
30				Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)	410
31				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components	464
32				Flaws in aircraft system maintenance process definition - APU systems and / or components	466
33				Flaws in aircraft system maintenance process definition - Fire detection system components	474
34				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components	475
35				Flaws in manufacturer quality control process - Fire detection system components	476
36				Flaws in aircraft system maintenance process definition - Fire warning system	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	479
39				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components	480
40				Flaws in aircraft system maintenance process definition - Fire extinguishing system components	481
41				Flaws in manufacturer quality control process - Fire extinguishing system components	482
42				Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491
43				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492
44				Flaws in manufacturer quality control process - Onboard navigational systems and components.	493
45				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components	391
47				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components	391
48				Flaws in aircraft system maintenance process definition - Power supply system components	387
49				Flaws in manufacturer quality control process -Hydraulic system components.	386
50				Inadequate certification process and / or flaws in methodology concerning verification 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
53				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Drag control system components.	381
54				Flaws in aircraft system maintenance process definition - Drag control system components.	379
55				Flaws in manufacturer quality control process - Drag control system components.	378
56				Flaws in aircraft system maintenance process definition - Landing gear components.	377
57				Flaws in manufacturer quality control process - Landing gear components.	376
58				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Pneumatic system components.	375
59				Flaws in aircraft system maintenance process definition - Pneumatic system components.	374
60				Flaws in manufacturer quality control process - Pneumatic system components.	373

	Base events	Code	Definition	Identifiable precursors	No.
III + II + I	Failure to Achieve Maximum Braking			Failure to Achieve Maximum Braking	
1	18 Insufficient Runway Length	TO01B31	The runway can be 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	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	179
5				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
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				System failure affecting aircraft configuration, controllability and/or flying qualities	25
9				System failure affecting the operation of primary instruments / displays or standby instruments	26
10				Prolonged loss of communications (PLOC) between pilot and controller(s)	53
11				Landing gear retraction failure	63
12				Engine failure	77
13				Cabin pressure drop as a result of pneumatic system failure	79
14				Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll	98
15				Lack of or poor communication quality	146
16				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
17				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
18				Inadequate aircraft de-icing / anti-icing	180
19				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components	230
20				Flaws in manufacturer quality control process - Power supply system components	238
21				Flaws in aircraft system maintenance process definition - Communication equipment systems and components.	270
22				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.	271
23				Flaws in manufacturer quality control process - Communication equipment systems and components.	272
24				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.	288
25				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299
26				Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)	306
27				Flaws in aircraft system maintenance process definition - Components of Wing control surface system.	311
28				Flaws in manufacturer quality control process - Components of Wing control surface system.	314
29				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine	316
30				Navigation deviation	317
31				Flaws in manufacturer quality control process - Autothrottle system in the engine.	324
32				Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.	325
33				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components	333
34				Flaws in aircraft system maintenance process definition - Hydraulic System	334
35				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
36				Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)	410
37				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components	464
38				Flaws in aircraft system maintenance process definition - APU systems and / or components	466
39				Flaws in aircraft system maintenance process definition - Fire detection system components	474
40				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire detection system components	475
41				Flaws in manufacturer quality control process - Fire detection system components	476
42				Flaws in aircraft system maintenance process definition - Fire warning system	477
43				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system	478
44				Flaws in manufacturer quality control process - Fire warning system	479
45				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components	480
46				Flaws in aircraft system maintenance process definition - Fire extinguishing system components	481

	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
49				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492
50				Flaws in manufacturer quality control process - Onboard navigational systems and components.	493
51				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components	391
53				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components	391
54				Flaws in aircraft system maintenance process definition - Power supply system components	387
55				Flaws in manufacturer quality control process -Hydraulic system components.	386
56				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - other critical flight instruments and systems.	385
57				Flaws in aircraft system maintenance process definition - other critical flight instruments and systems.	383
59				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Drag control system components.	381
60				Flaws in aircraft system maintenance process definition - Drag control system components.	379
61				Flaws in manufacturer quality control process - Drag control system components.	378
62				Flaws in aircraft system maintenance process definition - Landing gear components.	377
63				Flaws in manufacturer quality control process - Landing gear components.	376
64				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Pneumatic system components.	375
65				Flaws in aircraft system maintenance process definition - Pneumatic system components.	374
66				Flaws in manufacturer quality control process - Pneumatic system components.	373
67				Pilot tiredness - Inadequate workload distribution	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 distribution	150
5				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216
6				Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake).	366
7				System failure affecting aircraft configuration, controllability and/or flying qualities	25
8				System failure affecting the operation of primary instruments / displays or standby instruments	26
9				Prolonged loss of communications (PLOC) between pilot and controller(s)	53
10				Landing gear retraction failure	63
11				Engine failure	77
12				Cabin pressure drop as a result of pneumatic system failure	79
13				Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll	98
14				Lack of or poor communication quality	146
15				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
16				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
17				Inadequate aircraft de-icing / anti-icing	180
18				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components	230
19				Flaws in manufacturer quality control process - Power supply system components	238
20				Flaws in aircraft system maintenance process definition - Communication equipment systems and components.	270
21				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.	271
22				Flaws in manufacturer quality control process - Communication equipment systems and components.	272
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
24				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299
25				Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)	306
26				Flaws in aircraft system maintenance process definition - Components of Wing control surface system.	311
27				Flaws in manufacturer quality control process - Components of Wing control surface system.	314

	Base events	Code	Definition	Identifiable precursors	No.
28				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Autothrottle system in the engine	316
29				Navigation deviation	317
30				Flaws in manufacturer quality control process - Autothrottle system in the engine.	324
31				Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.	325
32				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components	333
33				Flaws in aircraft system maintenance process definition - Hydraulic System	334
34				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
35				Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)	410
36				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components	464
37				Flaws in aircraft system maintenance process definition - APU systems and / or components	466
38				Flaws in aircraft system maintenance process definition - Fire detection system components	474
39				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components	475
40				Flaws in manufacturer quality control process - Fire detection system components	476
41				Flaws in aircraft system maintenance process definition - Fire warning system	477
42				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system	478
43				Flaws in manufacturer quality control process - Fire warning system	479
44				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components	480
45				Flaws in aircraft system maintenance process definition - Fire extinguishing system components	481
46				Flaws in manufacturer quality control process - Fire extinguishing system components	482
47				Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491
48				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492
49				Flaws in manufacturer quality control process - Onboard navigational systems and components.	493
50				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components	391
52				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components	391
53				Flaws in aircraft system maintenance process definition - Power supply system components	387
54				Flaws in manufacturer quality control process -Hydraulic system components.	386
55				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - other critical flight instruments and systems.	385
56				Flaws in aircraft system maintenance process definition - other critical flight instruments and systems.	383
58				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Drag control system components.	381
59				Flaws in aircraft system maintenance process definition - Drag control system components.	379
60				Flaws in manufacturer quality control process - Drag control system components.	378
61				Flaws in aircraft system maintenance process definition - Landing gear components.	377
62				Flaws in manufacturer quality control process - Landing gear components.	376
63				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Pneumatic system components.	375
64				Flaws in aircraft system maintenance process definition - Pneumatic system components.	374
65				Flaws in manufacturer quality control process - Pneumatic system components.	373
66				Pilot tiredness - Inadequate workload distribution	167
67				Flaws in pilot requirements definition process and/or training methodology	168
68				Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207
69				Poor application of T/O & RTO procedure, failure recognition and preparedness	209
1	20 Brakes not applied correctly	TO01B33	Failure of the flight crew to apply all the braking systems immediately after take-off 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, braking initiation sequence	199
4				System failure affecting aircraft configuration, controllability and/or flying qualities	25
5				System failure affecting the operation of primary instruments / displays or standby instruments	26
6				Prolonged loss of communications (PLOC) between pilot and controller(s)	53
7				Landing gear retraction failure	63
8				Engine failure	77
9				Cabin pressure drop as a result of pneumatic system failure	79
10				Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll	98

Base events	Code	Definition	Identifiable precursors	No.
11			Lack of or poor communication quality	146
12			Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
13			Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
14			Inadequate aircraft de-icing / anti-icing	180
15			Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components	230
16			Flaws in manufacturer quality control process - Power supply system components	238
17			Flaws in aircraft system maintenance process definition - Communication equipment systems and components.	270
18			Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Communication equipment systems and components.	271
19			Flaws in manufacturer quality control process - Communication equipment systems and components.	272
20			Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.	288
21			Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299
22			Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)	306
23			Flaws in aircraft system maintenance process definition - Components of Wing control surface system.	311
24			Flaws in manufacturer quality control process - Components of Wing control surface system.	314
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			Navigation deviation	317
27			Flaws in manufacturer quality control process - Autothrottle system in the engine.	324
28			Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.	325
29			Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Hydraulic system components	333
30			Flaws in aircraft system maintenance process definition - Hydraulic System	334
31			Inadequate certification process and / or flaws in methodology concerning verification 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
33			Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components	464
34			Flaws in aircraft system maintenance process definition - APU systems and / or components	466
35			Flaws in aircraft system maintenance process definition - Fire detection system components	474
36			Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire detection system 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
39			Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire warning system	478
40			Flaws in manufacturer quality control process - Fire warning system	479
41			Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components	480
42			Flaws in aircraft system maintenance process definition - Fire extinguishing system components	481
43			Flaws in manufacturer quality control process - Fire extinguishing system components	482
44			Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491
45			Inadequate certification process and / or flaws in methodology concerning verification 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			Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components	391
49			Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Aircraft door system and / or components	391
50			Flaws in aircraft system maintenance process definition - Power supply system components	387
51			Flaws in manufacturer quality control process -Hydraulic system components.	386
52			Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - other critical flight instruments and systems.	385
53			Flaws in aircraft system maintenance process definition - other critical flight instruments and systems.	383
55			Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Drag control system components.	381

	Base events	Code	Definition	Identifiable precursors	No.
56				Flaws in aircraft system maintenance process definition - Drag control system components.	379
57				Flaws in manufacturer quality control process - Drag control system components.	378
58				Flaws in aircraft system maintenance process definition - Landing gear components.	377
59				Flaws in manufacturer quality control process - Landing gear components.	376
60				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Pneumatic system components.	375
61				Flaws in aircraft system maintenance process definition - Pneumatic system components.	374
62				Flaws in manufacturer quality control process - Pneumatic system components.	373
63				Pilot tiredness - Inadequate workload distribution	167
64				Flaws in pilot requirements definition process and/or training methodology	168
65				Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207
66				Poor application of T/O & RTO procedure, failure recognition and preparedness	209
I	Air Traffic related event			Air Traffic related event	
1	1 Take-off instruction error by ATCO	TO02B1111	Inadequate take-off instruction is given by the Air Traffic Control Officer (ATCO) which causes a potential hazardous encounter	Convective weather / turbulence / windshear or crosswind conditions during take-off	32
2				Traffic controller tiredness - Inadequate workload distribution	137
3				Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	139
4				Flaws in traffic controller requirements definition process and/or training methodology	145
1	2 Inadequate communication with pilot	TO02B1112	Ineffective communication between ATCO and flight crew that leads to misunderstanding, and which causes a potential hazardous encounter	Lack of English proficiency	132
2				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	137
5				Flaws in traffic controller requirements definition process and/or training methodology	145
6				Lack of or poor communication quality	146
7				Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	148
8				Pilot tiredness - Inadequate workload distribution	167
9				Flaws in pilot requirements definition process and/or training methodology	168
1	3 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	Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airspace and airport topology.	142
2				Pilot tiredness - Inadequate workload distribution	167
3				Flaws in pilot requirements definition process and/or training methodology	168
4				Lack of adherence to Rules of the Air - adherence to Controller clearance	296
1	4 Separation Infringement with Departing Aircraft caused by other a/c	TO02B1121	Aircraft loses separation with an aircraft departing which is caused by the other aircraft	Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications	140
2				Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airspace and airport topology.	142
3				Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	143
4				Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airspace or / and aircraft / vehicle proximity	144
5				Pilot tiredness - Inadequate workload distribution	167
6				Flaws in pilot requirements definition process and/or training methodology	168
7				Lack of adherence to Rules of the Air - adherence to Controller clearance	296
8				Taxiing without clearance	367
1	5 Separation Infringement with Landing Aircraft caused by other a/c	TO02B1122	Aircraft loses separation with an aircraft landing which is caused by the other aircraft	Emergency landing	8
2				Landing without clearance	158
3				Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	160
4				Pilot tiredness - Inadequate workload distribution	167
5				Flaws in pilot requirements definition process and/or training methodology	168
6				Lack of adherence to Rules of the Air - adherence to Controller clearance	296
1	6 Separation Infringement with a/c on missed approach	TO02B1123	Aircraft loses separation with an aircraft performing a missed approach	Emergency landing	8
2				Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	127
3				Traffic controller tiredness - Inadequate workload distribution	137
4				Flaws in traffic controller requirements definition process and/or training methodology	145
5				Landing without clearance	158
6				Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	160
7				Pilot tiredness - Inadequate workload distribution	167
8				Flaws in pilot requirements definition process and/or training methodology	168
9				Lack of adherence to Rules of the Air - adherence to Controller clearance	296
1	7 Separation Infringement with departing a/c caused by aircraft taking off	TO02B1124	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	140
2				Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airspace or / and aircraft / vehicle proximity	144
3				Takeoff without clearance	157
4				Pilot tiredness - Inadequate workload distribution	167
5				Flaws in pilot requirements definition process and/or training methodology	168
6				Lack of adherence to Rules of the Air - adherence to Controller clearance	296
1	8 Separation Infringement with landing a/c caused by aircraft taking off	TO02B1125	Aircraft loses separation with an aircraft landing 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	140
2				Takeoff without clearance	157
3				Pilot tiredness - Inadequate workload distribution	167
4				Flaws in pilot requirements definition process and/or training methodology	168
5				Lack of adherence to Rules of the Air - adherence to Controller clearance	296
1	9 Illegal A/C infringement	TO02B1126	Aircraft deliberately infringes separation disregarding the instruction from ATC	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151

Base events		Code	Definition	Identifiable precursors	No.
2				Pilot tiredness - Inadequate workload distribution	167
3				Flaws in pilot requirements definition process and/or training methodology	168
4				Lack of adherence to Rules of the Air - adherence to Controller clearance	296
1	10 Traffic density too high	TO02B1122	Traffic density above the airport is too high to allow the departing aircraft to take-off	Flaws in Airspace and Air Traffic planning procedures design process	323
2				Flaws in airport capacity management process	400
1	11 Aircraft not ready to take-off	TO02B1123	Flight crew are still preparing the aircraft for take-off when clearance is given resulting in the aircraft missing the allotted 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	264
5				Lack of adherence to SOP for take-off procedure in terms of time limitation for take-off preparation.	404
1	12 Animals in vicinity of runway	TO02B1124	The presence of animal in the runway area and which may cause a collision hazard	Wildlife incursion	5
2				Bird strike	34
3				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162
4				Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401
1	13 Weather Related Problem	TO02B1125	ATC advise the flight crew that the weather is unsuitable for take-off	Convective weather / turbulence / windshear or crosswind conditions during take-off	32
1	14 Effective Hazard Avoidance	TO02B12	ATC instructs aircraft to stop during take-off roll	Risk of dangerous occurrences appeared during take-off roll	85
II + I	Flight Crew rejects take-off			Flight Crew rejects take-off	
1	15 Pilot Misdiagnosis	TO02B211	The pilot fails to understand the air traffic situation and as a result 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				Late rejected takeoff decision / initiation	368
4				Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations	384
5				Wildlife incursion	5
6				Emergency landing	8
7				Convective weather / turbulence / windshear or crosswind conditions during take-off	32
8				Bird strike	34
9				Risk of dangerous occurrences appeared during take-off roll	85
10				Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	127
11				Lack of English proficiency	132
12				Incorrect or confusing / misleading ATC instructions	133
13				Use of non-standard phraseology by pilot and/or controller	134
14				Traffic controller tiredness - Inadequate workload distribution	137
15				Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	139
16				Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications	140
17				Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airside and airport topology.	142
18				Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	143
19				Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airside or / and aircraft / vehicle proximity	144
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				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
24				Takeoff without clearance	157
25				Landing without clearance	158
26				Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	160
27				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162
28				Pilot tiredness - Inadequate workload distribution	167
29				Flaws in pilot requirements definition process and/or training methodology	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	400
35				Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401
36				Lack of adherence to SOP for take-off procedure in terms of time limitation for take-off preparation.	404
37				Taxiing without clearance	367
1	16 Pilot Misjudgement	TO02B212	The pilot diagnoses the air traffic situation but misjudges the 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
7				Convective weather / turbulence / windshear or crosswind conditions during take-off	32
8				Bird strike	34
9				Risk of dangerous occurrences appeared during take-off roll	85
10				Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	127

Base events	Code	Definition	Identifiable precursors	No.
11			Lack of English proficiency	132
12			Incorrect or confusing / misleading ATC instructions	133
13			Use of non-standard phraseology by pilot and/or controller	134
14			Traffic controller tiredness - Inadequate workload distribution	137
15			Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	139
16			Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications	140
17			Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airtaxi and airport topology.	142
18			Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	143
19			Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airtaxi or / and aircraft / vehicle proximity	144
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			Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
24			Takeoff without clearance	157
25			Landing without clearance	158
26			Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	160
27			Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162
28			Pilot tiredness - Inadequate workload distribution	167
29			Flaws in pilot requirements definition process and/or training methodology	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	400
35			Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401
36			Lack of adherence to SOP for take-off procedure in terms of time limitation for take-off preparation.	404
37			Taxiing without clearance	367
1	Take-off rejected correctly when below 17 V1	TO02B22	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.	
2			not identifiable at that level	
3			Wildlife incursion	5
4			Emergency landing	8
5			Convective weather / turbulence / windshear or crosswind conditions during take-off	32
6			Bird strike	34
7			Risk of dangerous occurrences appeared during take-off roll	85
8			Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	127
9			Lack of English proficiency	132
10			Incorrect or confusing / misleading ATC instructions	133
11			Use of non-standard phraseology by pilot and/or controller	134
12			Traffic controller tiredness - Inadequate workload distribution	137
13			Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	139
14			Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications	140
15			Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airtaxi and airport topology.	142
16			Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	143
17			Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airtaxi or / and aircraft / vehicle proximity	144
18			Flaws in traffic controller requirements definition process and/or training methodology	145
19			Lack of or poor communication quality	146
20			Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	148
21			Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
22			Takeoff without clearance	157
23			Landing without clearance	158
24			Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	160
25			Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162
26			Pilot tiredness - Inadequate workload distribution	167
27			Flaws in pilot requirements definition process and/or training methodology	168
28			Flaws in CRM training procedures	263
29			Lack of adherence to the main CRM rules	264
30			Lack of adherence to Rules of the Air - adherence to Controller clearance	296
31			Flaws in Airspace and Air Traffic planning procedures design process	323
32			Flaws in airport capacity management process	400
33			Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401
34			Lack of adherence to SOP for take-off procedure in terms of time limitation for take-off preparation.	404
35			Taxiing without clearance	367

	Base events	Code	Definition	Identifiable precursors	No.
III + II + I	III			Failure to achieve maximum braking	
1	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.	
2				Convective weather - heavy rain resulted with wet RWY surface	75
3				Pilot tiredness - Inadequate workload distribution	167
4				Flaws in pilot requirements definition process and/or training methodology	168
5				Gross error in takeoff weight entry and/or in V1 / VR speeds assessment	179
6				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
7				High energy RTO rate is an indicator of improper Operator's policy for T/O operations.	211
8				Poor application of T/O & RTO procedure, computation of T/O parameters	260
9				Wildlife incursion	5
10				Emergency landing	8
11				Convective weather / turbulence / windshear or crosswind conditions during take-off	32
12				Bird strike	34
13				Risk of dangerous occurrences appeared during take-off roll	85
14				Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	127
15				Lack of English proficiency	132
16				Incorrect or confusing / misleading ATC instructions	133
17				Use of non-standard phraseology by pilot and/or controller	134
18				Traffic controller tiredness - Inadequate workload distribution	137
19				Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	139
20				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. Lack of awareness of own position on the airsite and airport topology.	142
22				Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	143
23				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
24				Flaws in traffic controller requirements definition process and/or training methodology	145
25				Lack of or poor communication quality	146
26				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 or / and passive contribution to the PF duties	151
28				Takeoff without clearance	157
29				Landing without clearance	158
30				Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	160
31				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162
32				Pilot tiredness - Inadequate workload distribution	167
33				Flaws in pilot requirements definition process and/or training methodology	168
34				Flaws in CRM training procedures	263
35				Lack of adherence to the main CRM rules	264
36				Lack of adherence to Rules of the Air - adherence to Controller clearance	296
37				Flaws in Airspace and Air Traffic planning procedures design process	323
38				Flaws in airport capacity management process	400
39				Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401
40				Lack of adherence to SOP for take-off procedure in terms of time limitation for take-off preparation.	404
41				Taxiing without clearance	367
42				Pilot tiredness - Inadequate workload distribution	167
43				Flaws in pilot requirements definition process and/or training methodology	168
44				Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207
45				Late rejected takeoff decision / initiation	368
1	19	Brakes not functioning correctly	TO02B32	Brakes are not giving maximum braking, i.e. because of improper maintenance and damages	
2				System failure affecting aircraft configuration, controllability and/or flying qualities	25
3				Contaminated Runway	39
4				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
5				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
6				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216
7				Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake).	366
8				Wildlife incursion	5
9				Emergency landing	8
10				Convective weather / turbulence / windshear or crosswind conditions during take-off	32
11				Bird strike	34
12				Risk of dangerous occurrences appeared during take-off roll	85
13				Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	127
14				Lack of English proficiency	132
15				Incorrect or confusing / misleading ATC instructions	133
16				Use of non-standard phraseology by pilot and/or controller	134
17				Traffic controller tiredness - Inadequate workload distribution	137

	Base events	Code	Definition	Identifiable precursors	No.
17				Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	139
18				Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications	140
19				Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.	142
20				Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	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
22				Flaws in traffic controller requirements definition process and/or training 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				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 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
29				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162
30				Pilot tiredness - Inadequate workload distribution	167
31				Flaws in pilot requirements definition process and/or training methodology	168
32				Flaws in CRM training procedures	263
33				Lack of adherence to the main CRM rules	264
34				Lack of adherence to Rules of the Air - adherence to Controller clearance	296
35				Flaws in Airspace and Air Traffic planning procedures design process	323
36				Flaws in airport capacity management process	400
37				Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence 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
42				Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207
43				Late rejected takeoff decision / initiation	368
44				Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations	384
1	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
2				Flaws in pilot requirements definition process and/or training methodology	168
3				Poor application of T/O & RTO procedure, braking initiation sequence	199
4				Wildlife incursion	5
5				Emergency landing	8
6				Convective weather / turbulence / windshear or crosswind conditions during take-off	32
7				Bird strike	34
8				Risk of dangerous occurrences appeared during take-off roll	85
9				Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	127
10				Lack of English proficiency	132
11				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 spots	139
15				Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications	140
16				Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airsite and airport topology.	142
17				Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	143
18				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
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				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
23				Takeoff without clearance	157
24				Landing without clearance	158
25				Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	160
26				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162
27				Pilot tiredness - Inadequate workload distribution	167
28				Flaws in pilot requirements definition process and/or training methodology	168
29				Flaws in CRM training procedures	263
30				Lack of adherence to the main CRM rules	264
31				Lack of adherence to Rules of the Air - adherence to Controller clearance	296
32				Flaws in Airspace and Air Traffic planning procedures design process	323
33				Flaws in airport capacity management process	400
34				Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401
35				Lack of adherence to SOP for take-off procedure in terms of time limitation for take-off preparation.	404
36				Taxiing without clearance	367

Base events		Code	Definition	Identifiable precursors	No.
37				Pilot tiredness - Inadequate workload distribution	167
38				Flaws in pilot requirements definition process and/or training methodology	168
39				Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207
40				Late rejected takeoff decision / initiation	368
41				Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations	384
I	Inappropriate handling by flight crew			Inappropriate handling by flight crew	
1	1 Unsuccessful handling due to lack of training	TO03B111	Untrained pilot flying (PF) handling take-offs with one engine inoperative on four engine aircraft.	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
1	2 Unsuccessful Handling	TO03B112	The pilot flying (PF) applies inappropriate handling that affects the directional stability of the aircraft during the take-off roll.	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 AFM limitations for Take-off	202
5				Failure to remember / assess crosswind component limit for prevailing runway condition	418
1	3 Adverse Weather Conditions	TO03B12	The prevailing weather conditions affect the directional stability of the aircraft during the take-off roll. The weather conditions that can cause this failure including strong winds and slippery runway conditions.	Convective weather / turbulence / windshear or crosswind conditions during take-off	32
2				Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate	45
3				Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling	200
4				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
II + I	II Take-off Rejection			Take-off Rejection	
1	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.	Pilot tiredness - Inadequate workload distribution	167
2				Flaws in pilot requirements definition process and/or training methodology	168
3				Late rejected takeoff decision / initiation	368
4				Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations	384
5				Convective weather / turbulence / windshear or crosswind conditions during take-off	32
6				Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate	45
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				Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling	200
11				Lack of adherence to AFM limitations for Take-off	202
12				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
13				Failure to remember / assess crosswind component limit for prevailing runway condition	418
1	5 Pilot Misjudgement	TO03B212	The pilot diagnoses the correct aircraft system failure but 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				Late rejected takeoff decision / initiation	368
5				Convective weather / turbulence / windshear or crosswind conditions during take-off	32
6				Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate	45
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				Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling	200
11				Lack of adherence to AFM limitations for Take-off	202
12				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
13				Failure to remember / assess crosswind component limit for prevailing runway condition	418
1	6 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.	not identifiable at that level	
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
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				Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling	200
8				Lack of adherence to AFM limitations for Take-off	202
9				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

Base events		Code	Definition	Identifiable precursors	No.
10				Failure to remember / assess crosswind component limit for prevailing runway condition	418
III + II + I					
	Failure to maintain control (V <= V1)			Failure to maintain control (V <= V1)	
1	7 Uncontrollable	TO03B31	No input to controls will allow the pilot to maintain control of the aircraft with speed less than V1	not identifiable at that level	
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
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				Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling	200
8				Lack of adherence to AFM limitations for Take-off	202
9				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
10				Failure to remember / assess crosswind component limit for prevailing runway condition	418
11				Pilot tiredness - Inadequate workload distribution	167
12				Flaws in pilot requirements definition process and/or training methodology	168
13				Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207
14				Late rejected takeoff decision / initiation	368
15				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				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
5				Adverse weather in terms of heavy rain or icing conditions resulted with decreased 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	202
11				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
12				Failure to remember / assess crosswind component limit for prevailing runway condition	418
13				Pilot tiredness - Inadequate workload distribution	167
14				Flaws in pilot requirements definition process and/or training methodology	168
15				Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207
16				Late rejected takeoff decision / initiation	368
17				Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations	384
1	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	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
5				Adverse weather in terms of heavy rain or icing conditions resulted with decreased 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	202
11				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
12				Failure to remember / assess crosswind component limit for prevailing runway condition	418
13				Pilot tiredness - Inadequate workload distribution	167
14				Flaws in pilot requirements definition process and/or training methodology	168
15				Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207
16				Late rejected takeoff decision / initiation	368
17				Poor application of T/O & RTO procedure, adherence to SOP and AFM limitations	384
1	10 Insufficient control	TO03B34	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
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
5				Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate	45

	Base events	Code	Definition	Identifiable precursors	No.
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	202
11				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
12				Failure to remember / assess crosswind component limit for prevailing runway condition	418
13				Pilot tiredness - Inadequate workload distribution	167
14				Flaws in pilot requirements definition process and/or training methodology	168
15				Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP 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 + III + II + I	IV Failure to Achieve Maximum Braking			Failure to Achieve Maximum Braking	
1	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.	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	179
5				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
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 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	168
13				Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling	200
14				Lack of adherence to AFM limitations for Take-off	202
15				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
16				Failure to remember / assess crosswind component limit for prevailing runway condition	418
17				Pilot tiredness - Inadequate workload distribution	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				Pilot tiredness - Inadequate workload distribution	167
23				Flaws in pilot requirements definition process and/or training methodology	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				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 distribution	150
5				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216
6				Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake).	366
7				Convective weather / turbulence / windshear or crosswind conditions during take-off	32
8				Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate	45
9				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
10				Pilot tiredness - Inadequate workload distribution	167
11				Flaws in pilot requirements definition process and/or training methodology	168
12				Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling	200
13				Lack of adherence to AFM limitations for Take-off	202
14				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
15				Failure to remember / assess crosswind component limit for prevailing runway condition	418
16				Pilot tiredness - Inadequate workload distribution	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

Base events		Code	Definition	Identifiable precursors	No.
19				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
1	13 Brakes not applied correctly	TO03B43	Failure of the flight crew to apply all the braking systems immediately after take-off 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, braking initiation sequence	199
4				Convective weather / turbulence / windshear or crosswind conditions during take-off	32
5				Adverse weather in terms of heavy rain or icing conditions resulted with decreased 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	202
11				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
12				Failure to remember / assess crosswind component limit for prevailing runway condition	418
13				Pilot tiredness - Inadequate workload distribution	167
14				Flaws in pilot requirements definition process and/or training methodology	168
15				Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207
16				Late rejected takeoff decision / initiation	368
17				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
V+					
I	V			Failure to maintain control	
1	14 Uncontrollable	TO03B51	No input to controls will allow the pilot to maintain control of the aircraft when take-off continued	not identifiable at the moment	
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
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				Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling	200
8				Lack of adherence to AFM limitations for Take-off	202
9				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
10				Failure to remember / assess crosswind component limit for prevailing runway condition	418
1	15 Lack of control	TO03B52	The pilot makes no attempt to control the aircraft when take-off 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	32
5				Adverse weather in terms of heavy rain or icing conditions resulted with decreased 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	202
11				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
12				Failure to remember / assess crosswind component limit for prevailing runway condition	418
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	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
5				Adverse weather in terms of heavy rain or icing conditions resulted with decreased 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	202
11				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

Base events		Code	Definition	Identifiable precursors	No.
12				Failure to remember / assess crosswind component limit for prevailing runway condition	418
1	17	Insufficient control	TO03B54	The pilot applies correct measures but are not enough to prevent aircraft leaving off the side of the runway	
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, aircraft handling	388
5				Convective weather / turbulence / windshear or crosswind conditions during take-off	32
6				Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate	45
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				Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling	200
11				Lack of adherence to AFM limitations for Take-off	202
12				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
I				Failure to remember / assess crosswind component limit for prevailing runway condition	418
1	1	Directional control systems failure	TO04B111	Directional control systems failure	
2		1 Main Gear Failure		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
5				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
6				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
7				Flaws in aircraft system maintenance process definition - Landing gear components.	377
1	2	Nose Gear Failure	TO04B112	Flaws in manufacturer quality control process - Landing gear components.	376
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
5				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
6				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
7				Flaws in aircraft system maintenance process definition - Landing gear components.	377
1	3	Brake System Failure	TO04B121	Flaws in manufacturer quality control process - Landing gear components.	376
2				Failure in any part of the brake system that results in asymmetric braking force being applied to the wheels and hence causes directional instability	
3				System failure affecting aircraft configuration, controllability and/or flying qualities	25
4				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
5				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
6				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
7				Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake).	366
1	4	Tyre Failure	TO04B122	Flaws in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake).	365
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
5				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
6				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
7				Flaws in aircraft system maintenance process definition - Landing gear components.	377
1	5	Wheel Sub-Assembly Failure	TO04B123	Flaws in manufacturer quality control process - Landing gear components.	376
2				Failure of any part of the wheel excluding tyre or braking system, i.e. an axle failure or wheel rim failure	
3				System failure affecting aircraft configuration, controllability and/or flying qualities	25
4				Tire burst	80
5				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
6				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
7				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
II + I	II	Take-off rejection		Flaws in aircraft system maintenance process definition - Landing gear components.	377
1				Flaws in manufacturer quality control process - Landing gear components.	376
2	6	Pilot Misdiagnosis	TO04B211	Take-off rejection	
3				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.	
4				Pilot tiredness - Inadequate workload distribution	167
5				Flaws in pilot requirements definition process and/or training methodology	168
6				Poor application of T/O & RTO procedure, failure recognition and preparedness	209
7				System failure affecting aircraft configuration, controllability and/or flying qualities	25
8				Tire burst	80

Base events		Code	Definition	Identifiable precursors	No.
6				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
7				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
8				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
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.	376
12				Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing 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	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.	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
6				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
7				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
8				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
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.	376
12				Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing 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	8 V1 Take-off rejected correctly when below V1	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.	not identifiable at that level	
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
5				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
6				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
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
10				Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake).	366
11				Flaws in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake).	365
III + II + I	Failure to maintain control (take-off rejected)			Failure to maintain control (take-off rejected)	
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
5				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
6				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
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
10				Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake).	366
11				Flaws in manufacturer quality control process - marshalling/rolling/taxiing control 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
14				Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP 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

Base events		Code	Definition	Identifiable precursors	No.
2				Flaws in pilot requirements definition process and/or training methodology	168
3				Poor application of T/O & RTO procedure, aircraft handling	388
4				System failure affecting aircraft configuration, controllability and/or flying qualities	25
5				Tire burst	80
6				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
7				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
8				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
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.	376
12				Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing 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
14				Pilot tiredness - Inadequate workload distribution	167
15				Flaws in pilot requirements definition process and/or training methodology	168
16				Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207
17				Poor application of T/O & RTO procedure, failure recognition and preparedness	209
1	11	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	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				System failure affecting aircraft configuration, controllability and/or flying qualities	25
5				Tire burst	80
6				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
7				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
8				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
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.	376
12				Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing 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
14				Pilot tiredness - Inadequate workload distribution	167
15				Flaws in pilot requirements definition process and/or training methodology	168
16				Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207
17				Poor application of T/O & RTO procedure, failure recognition and preparedness	209
1	12	TO04B34	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
2				Flaws in pilot requirements definition process and/or training methodology	168
3				Poor application of T/O & RTO procedure, aircraft handling	388
4				System failure affecting aircraft configuration, controllability and/or flying qualities	25
5				Tire burst	80
6				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
7				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
8				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
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.	376
12				Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing 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
14				Pilot tiredness - Inadequate workload distribution	167
15				Flaws in pilot requirements definition process and/or training methodology	168
16				Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207
17				Poor application of T/O & RTO procedure, failure recognition and preparedness	209
IV + III + II + I	IV	Failure to Achieve Maximum Braking (V<V1)		Failure to Achieve Maximum Braking (V<V1)	
1	13	TO04B41	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.	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	179

	Base events	Code	Definition	Identifiable precursors	No.
5				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
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				System failure affecting aircraft configuration, controllability and/or flying qualities	25
9				Tire burst	80
10				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
11				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
12				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
13				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
14				Flaws in aircraft system maintenance process definition - Landing gear components.	377
15				Flaws in manufacturer quality control process - Landing gear components.	376
16				Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake).	366
17				Flaws in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake).	365
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, adherence to SOP, criteria for STOP decision	207
21				Poor application of T/O & RTO procedure, failure recognition and preparedness	209
22				Pilot tiredness - Inadequate workload distribution	167
23				Flaws in pilot requirements definition process and/or training methodology	168
24				Poor application of T/O & RTO procedure, aircraft handling	388
1	14 Brakes not functioning correctly	TO04B42	Brakes are not giving maximum braking, e.g. because of improper maintenance and damages	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 distribution	150
5				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216
6				Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake).	366
7				System failure affecting aircraft configuration, controllability and/or flying qualities	25
8				Tire burst	80
9				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
10				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
11				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
12				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
13				Flaws in aircraft system maintenance process definition - Landing gear components.	377
14				Flaws in manufacturer quality control process - Landing gear components.	376
15				Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake).	366
16				Flaws in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake).	365
17				Pilot tiredness - Inadequate workload distribution	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				Poor application of T/O & RTO procedure, failure recognition and preparedness	209
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
1	15 Brakes not applied correctly	TO04B43	Failure of the flight crew to apply all the braking systems immediately after take-off 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, braking initiation sequence	199
4				System failure affecting aircraft configuration, controllability and/or flying qualities	25
5				Tire burst	80
6				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
7				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
8				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
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.	376
12				Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing 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
14				Pilot tiredness - Inadequate workload distribution	167

Base events		Code	Definition	Identifiable precursors	No.
15				Flaws in pilot requirements definition process and/or training methodology	168
16				Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207
17				Poor application of T/O & RTO procedure, failure recognition and preparedness	209
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 + I	V			Failure to Maintain control (take-off continued)	
1	16	Uncontrollable	TO04B51	No input to controls will allow the pilot to maintain control of the aircraft.	
2				Failure to Maintain control (take-off continued)	
3				not identifiable at that level	
4				System failure affecting aircraft configuration, controllability and/or flying qualities	25
5				Tire burst	80
6				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
7				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
8				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
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.	376
12				Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing 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	17	Lack of Control	TO04B52	The pilot makes no attempt to control the aircraft.	
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, aircraft handling	388
5				System failure affecting aircraft configuration, controllability and/or flying qualities	25
6				Tire burst	80
7				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
8				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
9				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
10				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
11				Flaws in aircraft system maintenance process definition - Landing gear components.	377
12				Flaws in manufacturer quality control process - Landing gear components.	376
13				Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake).	366
14				Flaws in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake).	365
1	18	Incorrect Control	TO04B53	The pilot applies incorrect control to the aircraft. This can be due to improper training, stress and fatigue	
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, aircraft handling	388
5				System failure affecting aircraft configuration, controllability and/or flying qualities	25
6				Tire burst	80
7				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
8				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
9				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
10				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
11				Flaws in aircraft system maintenance process definition - Landing gear components.	377
12				Flaws in manufacturer quality control process - Landing gear components.	376
13				Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake).	366
14				Flaws in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake).	365
1	19	Insufficient Control	TO04B54	The pilot applies correct measures but are not enough to prevent aircraft leaving off the side of the runway	
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, aircraft handling	388
5				System failure affecting aircraft configuration, controllability and/or flying qualities	25
6				Tire burst	80
7				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
8				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
9				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
10				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
11				Flaws in aircraft system maintenance process definition - Landing gear components.	377
12				Flaws in manufacturer quality control process - Landing gear components.	376
13				Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake).	366
14				Flaws in manufacturer quality control process - marshalling/rolling/taxiing control related system and components (incl. brake).	365

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	
1	1 Unsuccessful TO configuration checklist	TO05B111	Co-pilot fails to determine the position of the flap and slats required for a successful take-off	Pilot tiredness - Inadequate workload distribution	167
2				Flaws in pilot requirements definition process and/or training methodology	168
3				Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.	198
4				Incorrect stab-trim setting	258
5				Undetected incorrect takeoff configuration	259
1	2 Unsuccessful Checklist Verification	TO05B112	Captain fails to identify the incorrect position of the flap and slats 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
1	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 the stand	Unintuitive and / or error prone system manual - FMC	217
2				Pilot tiredness - Inadequate workload distribution	167
3				Flaws in pilot requirements definition process and/or training methodology	168
1	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				Flaws in pilot requirements definition process and/or training methodology	168
3				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
4				Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201
1	5 Verification unsuccessful	TO05B22	Captain performs the take-off configuration check but fails to notice that the aircraft is configured incorrectly.	Pilot tiredness - Inadequate workload distribution	167
2				Flaws in pilot requirements definition process and/or training methodology	168
II	Take-off configuration warning			Take-off configuration warning	
1	6 Unsuccessful Manufacture	TO05B311	TOCW system fails due to unsuccessful manufacture and hence the take-off is not rejected	Inadequate certification process and / or flaws in methodology concerning verification 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
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				Unintuitive and / or error prone system manual - ground radar.	164
6				Unintuitive and / or error prone system manual - FMC	217
7				Flaws in pilot requirements definition process and/or training methodology	168
8				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 configuration before application of take-off power.	201
10				Incorrect stab-trim setting	258
11				Undetected incorrect takeoff configuration	259
1	7 Unsuccessful Maintenance	TO05B312	TOCW system fails due to unsuccessful maintenance and hence the take-off is not rejected	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				Flaws in aircraft system maintenance process definition - TOCW System	204
4				System failure affecting aircraft configuration, controllability and/or flying qualities	25
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
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
10				Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201
11				Incorrect stab-trim setting	258
12				Undetected incorrect takeoff configuration	259
1	8 Unsuccessful Operation	TO05B313	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 circuit breaker following testing	Incorrect use of automation - TOCW System	192
2				Pilot tiredness - Inadequate workload distribution	167
3				Flaws in pilot requirements definition process and/or training methodology	168
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				Unintuitive and / or error prone system manual - TOCW	219
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				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
11				Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201
12				Incorrect stab-trim setting	258
13				Undetected incorrect takeoff configuration	259
1	9 Unsuccessful Manufacture	TO05B321	TOCW power supply fails due to unsuccessful manufacture and hence the take-off is not rejected	Flaws in manufacturer quality control process - Power supply system components	238
2				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components	230
3				System failure affecting the operation of primary instruments / displays or standby instruments	26
4				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151

Base events		Code	Definition	Identifiable precursors	No.
5				Unintuitive and / or error prone system manual - FMC	217
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 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 configuration before application of take-off power.	201
10				Incorrect stab-trim setting	258
11				Undetected incorrect takeoff configuration	259
1	10 Unsuccessful Maintenance	TO05B322	TOCW power supply fails due to unsuccessful maintenance and hence the take-off is not rejected	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				Flaws in aircraft system maintenance process definition - Electrical wiring System	252
4				System failure affecting the operation of primary instruments / displays or standby instruments	26
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
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
10				Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201
11				Incorrect stab-trim setting	258
12				Undetected incorrect takeoff configuration	259
1	11 Aircraft takes-off with incorrect configuration	TO05B33	Aircraft is still able to take-off even with the incorrect configuration	not identifiable at the moment	
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				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	168
6				Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.	198
7				Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201
8				Incorrect stab-trim setting	258
9				Undetected incorrect takeoff configuration	259
III+ I	III Flight crew rejects take-off			Flight crew rejects take-off	
1	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	Cautions / warnings (genuine or spurious) that may lead to a low-speed or high-speed rejected take-off	46
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				Pilot tiredness - Inadequate workload distribution	167
4				Flaws in pilot requirements definition process and/or training methodology	168
5				Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207
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				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
11				Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201
12				Incorrect stab-trim setting	258
13				Undetected incorrect takeoff configuration	259
1	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-off	Cautions / warnings (genuine or spurious) that may lead to a low-speed or high-speed rejected take-off	46
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, adherence to SOP, criteria for STOP 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
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
10				Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201
11				Incorrect stab-trim setting	258
12				Undetected incorrect takeoff configuration	259
1	14 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 probability.	not identifiable at the moment	
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				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	168
6				Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.	198
7				Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201

Base events		Code	Definition	Identifiable precursors	No.
8				Incorrect stab-trim setting	258
9				Undetected incorrect takeoff configuration	259
IV+ III+ I	IV				
				Failure to achieve maximum braking	
1	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.	
				Adverse weather in terms of heavy rain or icing conditions resulted with decreased 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
5				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
6				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
7				High energy RTO rate is an indicator of improper Operator's policy for T/O operations.	211
8				Gross error in takeoff weight entry and/or in V1 / VR speeds assessment	179
9				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
10				Unintuitive and / or error prone system manual - FMC	217
11				Pilot tiredness - Inadequate workload distribution	167
12				Flaws in pilot requirements definition process and/or training methodology	168
13				Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.	198
14				Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201
15				Incorrect stab-trim setting	258
16				Undetected incorrect takeoff configuration	259
17				Cautions / warnings (genuine or spurious) that may lead to a low-speed or high-speed rejected take-off	46
18				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 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	168
21				Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207
1	16	Brakes not functioning correctly	TO05B52	Brakes are not giving maximum braking, e.g. because of improper maintenance and damages	
2				System failure affecting aircraft configuration, controllability and/or flying qualities	25
3				Pilot tiredness - Inadequate workload distribution	167
4				Flaws in pilot requirements definition process and/or training methodology	168
5				Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake).	366
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				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
11				Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201
12				Incorrect stab-trim setting	258
13				Undetected incorrect takeoff configuration	259
14				Cautions / warnings (genuine or spurious) that may lead to a low-speed or high-speed rejected take-off	46
15				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
16				Pilot tiredness - Inadequate workload distribution	167
17				Flaws in pilot requirements definition process and/or training methodology	168
1	17	Brakes not applied correctly	TO05B53	Failure of the flight crew to apply all the braking systems immediately after take-off rejection.	
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, braking initiation sequence	199
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
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
10				Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201
11				Incorrect stab-trim setting	258
12				Undetected incorrect takeoff configuration	259
13				Cautions / warnings (genuine or spurious) that may lead to a low-speed or high-speed rejected take-off	46
14				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 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
1	18	Stall Unavoidable	TO05B61	No input to controls will allow the flight crew to avoid the stall	
V+I +II	V	Aircraft stalls after rotation		Aircraft stalls after rotation	
				not identifiable at that level	

Base events		Code	Definition	Identifiable precursors	No.
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				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	168
6				Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.	198
7				Lack of adherence to SOP for take-off procedure in terms of checking take-off 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
11				System failure affecting the operation of primary instruments / displays or standby instruments	26
12				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
13				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
14				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 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				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System	229
21				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system 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
1	19 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	197
2				Pilot tiredness - Inadequate workload distribution	167
3				Flaws in pilot requirements definition process and/or training methodology	168
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				Unintuitive and / or error prone system manual - FMC	217
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 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 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
13				System failure affecting the operation of primary instruments / displays or standby instruments	26
14				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
15				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
16				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				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 of the system / product compliance with requirements - TOCW System	229
23				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system 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
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	26
2				Flaws in aircraft system maintenance process definition - stickshaker	136
3				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
4				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
5				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - stickshaker system components	161
6				Flaws in manufacturer quality control process - Stickshaker system components	266
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				Unintuitive and / or error prone system manual - FMC	217
9				Pilot tiredness - Inadequate workload distribution	167
10				Flaws in pilot requirements definition process and/or training methodology	168
11				Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.	198
12				Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201
13				Incorrect stab-trim setting	258
14				Undetected incorrect takeoff configuration	259
15				System failure affecting aircraft configuration, controllability and/or flying qualities	25

Base events	Code	Definition	Identifiable precursors	No.	
			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	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 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	
1	21	Stall AOA too low	TO05B6212	Stall occurs at an AOA that is less than the AOA required to activate the stick-shaker	
2				Contaminated wing	12
3				Extreme icing conditions encounter	20
4				System failure affecting the operation of primary instruments / displays or standby instruments	26
5				Inadequate aircraft de-icing / anti-icing	180
6				Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing	208
7				Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.	210
8				Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT)	212
9				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - anti-ice fluid HOT	213
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 monitoring	231
12				Lack of adherence to SOP in terms of de-icing / anti-icing procedures.	232
13				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
14				Unintuitive and / or error prone system manual - FMC	217
15				Pilot tiredness - Inadequate workload distribution	167
16				Flaws in pilot requirements definition process and/or training methodology	168
17				Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.	198
18				Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201
19				Incorrect stab-trim setting	258
20				Undetected incorrect takeoff configuration	259
21				System failure affecting aircraft configuration, controllability and/or flying qualities	25
22				System failure affecting the operation of primary instruments / displays or standby instruments	26
23				Flaws in maintenance technician / airworthiness specialist requirements definition 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 or / and passive contribution to the PF duties	151
26				Pilot tiredness - Inadequate workload distribution	167
27				Flaws in pilot requirements definition process and/or training methodology	168
28				Incorrect use of automation - TOCW System	192
29				Flaws in aircraft system maintenance process definition - TOCW System	204
30				Unintuitive and / or error prone system manual - TOCW	219
31				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System	229
32				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components	230
33				Flaws in manufacturer quality control process - Power supply system components	238
VI+ II+ VI				Flaws in aircraft system maintenance process definition - Electrical wiring System	252
				Flight crew fails to regain control	
1	22	Uncontrollable	TO05B71	No input to controls will allow the flight crew to maintain control of the aircraft.	
2				not identifiable at that level	
3				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
4				Unintuitive and / or error prone system manual - FMC	217
5				Pilot tiredness - Inadequate workload distribution	167
6				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 configuration.	198
8				Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201
9				Incorrect stab-trim setting	258
10				Undetected incorrect takeoff configuration	259
11				System failure affecting aircraft configuration, controllability and/or flying qualities	25
12				System failure affecting the operation of primary instruments / displays or standby instruments	26
13				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150

	Base events	Code	Definition	Identifiable precursors	No.
14				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 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				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System	229
21				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system 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
24				Contaminated wing	12
25				Extreme icing conditions encounter	20
26				System failure affecting the operation of primary instruments / displays or standby instruments	26
27				Flaws in aircraft system maintenance process definition - stickshaker	136
28				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
29				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
30				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - stickshaker system components	161
31				Pilot tiredness - Inadequate workload distribution	167
32				Flaws in pilot requirements definition process and/or training methodology	168
33				Inadequate aircraft de-icing / anti-icing	180
34				Lack of adherence to SOP in terms of awareness on supporting systems warning - stickshaker	197
35				Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing	208
36				Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.	210
37				Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT)	212
38				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - anti-ice fluid HOT	213
39				Applied de-icing / anti-icing method is not sufficient for predicted conditions	228
40				Lack of adherence to SOP in terms of aircraft icing monitoring	231
41				Lack of adherence to SOP in terms of de-icing / anti-icing procedures.	232
1	23	Lack of control	TO05B72	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 AFM in terms of emergency procedures - stall recovery	292
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				Unintuitive and / or error prone system manual - FMC	217
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 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 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
13				System failure affecting the operation of primary instruments / displays or standby instruments	26
14				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
15				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
16				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				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 of the system / product compliance with requirements - TOCW System	229
23				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system 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
26				Contaminated wing	12
27				Extreme icing conditions encounter	20
28				System failure affecting the operation of primary instruments / displays or standby instruments	26
29				Flaws in aircraft system maintenance process definition - stickshaker	136
30				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
31				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
32				Inadequate certification process and / or flaws in methodology concerning verification 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

Base events	Code	Definition	Identifiable precursors	No.
			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 - anti-ice fluid HOT	213
			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
1	24 Incorrect Control	TO05B73	The pilot applies incorrect control to the aircraft. This can be due to improper training, stress and fatigue	
2			Flaws in pilot requirements definition process and/or training methodology	168
3			Pilot tiredness - Inadequate workload distribution	167
4			Lack of adherence to AFM in terms of emergency procedures - stall recovery	292
5			Inadequate stall recovery procedure for the aircraft	152
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			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
11			Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201
12			Incorrect stab-trim setting	258
13			Undetected incorrect takeoff configuration	259
14			System failure affecting aircraft configuration, controllability and/or flying qualities	25
15			System failure affecting the operation of primary instruments / displays or standby instruments	26
16			Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
17			Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
18			Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring 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	168
21			Incorrect use of automation - TOCW System	192
22			Flaws in aircraft system maintenance process definition - TOCW System	204
23			Unintuitive and / or error prone system manual - TOCW	219
24			Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System	229
25			Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components	230
26			Flaws in manufacturer quality control process - Power supply system components	238
27			Flaws in aircraft system maintenance process definition - Electrical wiring System	252
28			Contaminated wing	12
29			Extreme icing conditions encounter	20
30			System failure affecting the operation of primary instruments / displays or standby instruments	26
31			Flaws in aircraft system maintenance process definition - stickshaker	136
32			Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
33			Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
34			Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - stickshaker system components	161
35			Pilot tiredness - Inadequate workload distribution	167
36			Flaws in pilot requirements definition process and/or training methodology	168
37			Inadequate aircraft de-icing / anti-icing	180
38			Lack of adherence to SOP in terms of awareness on supporting systems warning - stickshaker	197
39			Poor application of T/O procedure, use of MET / ATIS information, aircraft de-icing	208
40			Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.	210
41			Lack of adherence to SOP in terms of anti-icing fluid Holdover time (HOT)	212
42			Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - anti-ice fluid HOT	213
43			Applied de-icing / anti-icing method is not sufficient for predicted conditions	228
44			Lack of adherence to SOP in terms of aircraft icing monitoring	231
1	25 Insufficient control	TO05B74	The pilot applies correct measures but are not enough to prevent aircraft leaving off the side of the runway	
2			Lack of adherence to SOP in terms of de-icing / anti-icing procedures.	232
3			Flaws in pilot requirements definition process and/or training methodology	168
4			Pilot tiredness - Inadequate workload distribution	167
5			Lack of adherence to AFM in terms of emergency procedures - stall recovery	292
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			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
11			Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201
12			Incorrect stab-trim setting	258
13			Undetected incorrect takeoff configuration	259
14			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 process and/or training methodology	149

	Base events	Code	Definition	Identifiable precursors	No.
15				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
16				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				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 of the system / product compliance with requirements - TOCW System	229
23				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system 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
26				Contaminated wing	12
27				Extreme icing conditions encounter	20
28				System failure affecting the operation of primary instruments / displays or standby instruments	26
29				Flaws in aircraft system maintenance process definition - stickshaker	136
30				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
31				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
32				Inadequate certification process and / or flaws in methodology concerning verification 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
40				Inadequate certification process and / or flaws in methodology concerning verification 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
I	Single Engine Failure			Single Engine Failure	
1	1 Unsuccessful Manufacturing	TO09B11	Manufacture failure of a part of the engine which creates an undetectable defect or a defect that is detectable by the manufacturers testing but not by maintenance testing	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or 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
1	2 Unsuccessful Maintenance	TO09B12	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	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 - Engine systems and / or components	454
4				Flaws in manufacturer quality control process - Engine systems and / or components	458
5				Flaws in aircraft system maintenance process definition - Engine systems and / or components	463
1	3 Unsuccessful Manufacture and Maintenance	TO09B13	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	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 - Engine systems and / or components	454
4				Flaws in manufacturer quality control process - Engine systems and / or components	458
5				Flaws in aircraft system maintenance process definition - Engine systems and / or components	463
1	4 Foreign Object Damage	TO09B14	Engine ingests objects such as debris left on the runway by other aircraft or it suffers a bird strike	Wildlife incursion	5
2				Bird strike	34
3				Contaminated Runway	39
4				Tire burst	80
5				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
6				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
7				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162
8				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216
9				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
10				Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401
11				Flaws in aircraft system maintenance process definition - Landing gear components.	377
12				Flaws in manufacturer quality control process - Landing gear components.	376

	Base events	Code	Definition	Identifiable precursors	No.
II+I	II			Flight crew rejects take-off	
1	5 Pilot Misdiagnosis	TO09B211	The pilot either misdiagnoses the situation or misunderstands the effects caused by a single engine failure, and hence 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, failure recognition and preparedness	209
4				Wildlife incursion	5
5				Bird strike	34
6				Contaminated Runway	39
7				Tire burst	80
8				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
9				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
10				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162
11				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - 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
13				Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401
14				Inadequate certification process and / or flaws in methodology concerning verification 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
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
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				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				Wildlife incursion	5
5				Bird strike	34
6				Contaminated Runway	39
7				Tire burst	80
8				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
9				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
10				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162
11				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - 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
13				Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401
14				Inadequate certification process and / or flaws in methodology concerning verification 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
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
1	Take-off rejected correctly when below V1	TO09B22	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.	not identifiable at that level	
2				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
7				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
8				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162
9				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216
10				Inadequate certification process and / or flaws in methodology concerning verification 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 integrity monitoring	401
12				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components	454
13				Flaws in manufacturer quality control process - Engine systems and / or components	458
14				Flaws in aircraft system maintenance process definition - Engine systems and / or 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

	Base events	Code	Definition	Identifiable precursors	No.
III+ II+ III	Flight crew fails to maintain control (Take-off rejected)			Flight crew fails to maintain control (Take-off rejected)	
1	8 Uncontrollable	TO09B31	No input to controls will allow the pilot to maintain control of the aircraft after take-off rejection	not identifiable at the moment	
2				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
7				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
8				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162
9				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216
10				Inadequate certification process and / or flaws in methodology concerning verification 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 integrity monitoring	401
12				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components	454
13				Flaws in manufacturer quality control process - Engine systems and / or components	458
14				Flaws in aircraft system maintenance process definition - Engine systems and / or 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
17				Pilot tiredness - Inadequate workload distribution	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				Poor application of T/O & RTO procedure, failure recognition and preparedness	209
1	9 Lack of control	TO09B32	The pilot makes no attempt to control the aircraft after take-off 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				Wildlife incursion	5
5				Bird strike	34
6				Contaminated Runway	39
7				Tire burst	80
8				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
9				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
10				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162
11				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - 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
13				Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401
14				Inadequate certification process and / or flaws in methodology concerning verification 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
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	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
1	10 Incorrect Control	TO09B33	The pilot applies incorrect control to the aircraft after take-off rejection. This can be due to improper training, stress and fatigue	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				Bird strike	34
6				Contaminated Runway	39
7				Tire burst	80
8				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
9				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
10				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162
11				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - 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
13				Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401

	Base events	Code	Definition	Identifiable precursors	No.
14				Inadequate certification process and / or flaws in methodology concerning verification 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
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	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
1	11 Insufficient control	TO09B34	The pilot applies correct measures after take-off rejection but are 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				Poor application of T/O & RTO procedure, aircraft handling	388
4				Wildlife incursion	5
5				Bird strike	34
6				Contaminated Runway	39
7				Tire burst	80
8				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
9				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
10				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162
11				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - 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
13				Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401
14				Inadequate certification process and / or flaws in methodology concerning verification 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
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	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
IV+ III+ II+I	IV Failure to achieve maximum braking			Failure to achieve maximum braking	
1	12 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.	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	179
5				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
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				Wildlife incursion	5
9				Bird strike	34
10				Contaminated Runway	39
11				Tire burst	80
12				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
13				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
14				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162
15				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216
16				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
17				Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401
18				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components	454
19				Flaws in manufacturer quality control process - Engine systems and / or components	458
20				Flaws in aircraft system maintenance process definition - Engine systems and / or components	463
21				Flaws in aircraft system maintenance process definition - Landing gear components.	377
22				Flaws in manufacturer quality control process - Landing gear components.	376
23				Pilot tiredness - Inadequate workload distribution	167
24				Flaws in pilot requirements definition process and/or training methodology	168
25				Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207

	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				Contaminated Runway	39
7				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
8				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
9				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216
10				Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing 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
16				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
17				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162
18				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216
19				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
20				Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401
21				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components	454
22				Flaws in manufacturer quality control process - Engine systems and / or components	458
23				Flaws in aircraft system maintenance process definition - Engine systems and / or 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
28				Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207
29				Poor application of T/O & RTO procedure, failure recognition and preparedness	209
30				Pilot tiredness - Inadequate workload distribution	167
31				Flaws in pilot requirements definition process and/or training methodology	168
32				Poor application of T/O & RTO procedure, aircraft handling	388
1	14 Brakes not applied correctly	TO09B43	Failure of the flight crew to apply all the braking systems immediately after take-off 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, braking initiation sequence	199
4				Wildlife incursion	5
5				Bird strike	34
6				Contaminated Runway	39
7				Tire burst	80
8				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
9				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
10				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162
11				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - 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
13				Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401
14				Inadequate certification process and / or flaws in methodology concerning verification 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
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	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
23				Pilot tiredness - Inadequate workload distribution	167
24				Flaws in pilot requirements definition process and/or training methodology	168
25				Poor application of T/O & RTO procedure, aircraft handling	388
V+V	Flight crew fails to maintain control (Take-off continued)			Flight crew fails to maintain control (Take-off continued)	
1	15 Uncontrollable	TO09B51	No input to controls will allow the pilot to maintain control of the aircraft after take-off continuation	not identifiable at that level	
2				Wildlife incursion	5
3				Bird strike	34
4				Contaminated Runway	39

	Base events	Code	Definition	Identifiable precursors	No.
5				Tire burst	80
6				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
7				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
8				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162
9				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216
10				Inadequate certification process and / or flaws in methodology concerning verification 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 integrity monitoring	401
12				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Engine systems and / or components	454
13				Flaws in manufacturer quality control process - Engine systems and / or components	458
14				Flaws in aircraft system maintenance process definition - Engine systems and / or 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	Pilot tiredness - Inadequate workload distribution	167
2				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	34
6				Contaminated Runway	39
7				Tire burst	80
8				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
9				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
10				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162
11				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - 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
13				Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401
14				Inadequate certification process and / or flaws in methodology concerning verification 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
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
1	17 Incorrect Control	TO09B53	The pilot applies incorrect control to the aircraft after take-off continuation. This can be due to 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 AFM in terms of emergency procedures - stall recovery	292
4				Wildlife incursion	5
5				Bird strike	34
6				Contaminated Runway	39
7				Tire burst	80
8				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
9				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
10				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162
11				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - 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
13				Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401
14				Inadequate certification process and / or flaws in methodology concerning verification 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
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
1	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	Pilot tiredness - Inadequate workload distribution	167
2				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	34
6				Contaminated Runway	39
7				Tire burst	80
8				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149

	Base events	Code	Definition	Identifiable precursors	No.
9				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
10				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162
11				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - 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
13				Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401
14				Inadequate certification process and / or flaws in methodology concerning verification 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
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
I	Pitch Control Problem			Pitch Control Problem	
1	1 Trim settings incorrectly determined	TO10B1111	Flight crew fail to complete the trim configuration checklist and fail to verify the checklist	Pilot tiredness - Inadequate workload distribution	167
2				Flaws in pilot requirements definition process and/or training methodology	168
3				Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.	198
4				Incorrect stab-trim setting	258
1	2 Speed settings incorrectly determined	TO10B1112	Flight crew fail to complete the speed bug checklist and fail to verify the checklist	Pilot tiredness - Inadequate workload distribution	167
2				Flaws in pilot requirements definition process and/or training methodology	168
3				Lack of adherence to SOP for take-off procedure in terms of speed bug checklist preparation and verification.	419
1	3 Trim settings incorrectly entered into FMC	TO10B1112	Given that the trim settings have been correctly determined, the co-pilot enter the settings incorrectly and these are verified by the captain during the taxi checklist	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
1	4 Speed settings incorrectly entered into FMC	TO10B1113	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	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
1	5 Unsuccessful Pitch Control Inputs	TO10B112	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
1	6 Unsuccessful Design	TO10B1311	Unsuccessful design of one of the integral components causes the failure of a flight control system	System failure affecting the operation of primary instruments / displays or standby instruments	26
2				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FCS system or components	420
1	7 Unsuccessful Manufacture	TO10B1312	Unsuccessful manufacture of one of the integral components causes the failure of a flight control system	System failure affecting the operation of primary instruments / displays or standby instruments	26
2				Flaws in manufacturer quality control process - FCS system components	421
1	8 Unsuccessful Maintenance	TO10B1313	Maintenance of the flight control system is not conducted or not successfully completed such that one of the flight control system fails	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				Flaws in aircraft system maintenance process definition - FCS systems or components	422
1	9 Foreign Object Damage	TO10B1314	A foreign object strikes one of the control surfaces rendering it ineffective. Such objects include birds and runway debris	Wildlife incursion	5
2				Bird strike	34
3				Contaminated Runway	39
4				Tire burst	80
5				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
6				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
7				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162
8				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216
9				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
10				Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401
11				Flaws in aircraft system maintenance process definition - Landing gear components.	377
12				Flaws in manufacturer quality control process - Landing gear components.	376
1	10 Severe Flight Control System Failure	TO10B132	Given the occurrence of a flight control system failure, the failure is severe enough to cause a pitch control problem	System failure affecting the operation of primary instruments / displays or standby instruments	26
2				Slow rotation (i.e., low pitch rate)	371
3				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FCS system or components	420

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
II+ II	Flight crew rejects to take-off			Flight crew rejects to take-off	
1	11 Crew Misdiagnose Situation	TO10B211	The pilot misdiagnoses the situation and either fails to realise what is causing the pitch control problems or wrongly attributes them to something else.	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, failure recognition and preparedness	209
4				Wildlife incursion	5
5				System failure affecting the operation of primary instruments / displays or standby 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
10				Maintenance technician / airworthiness specialist tiredness - Inadequate workload 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
16				Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201
17				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216
18				Incorrect stab-trim setting	258
19				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
20				Slow rotation (i.e., low pitch rate)	371
21				Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401
22				Lack of adherence to SOP for take-off procedure in terms of speed bug checklist preparation and verification.	419
23				Inadequate certification process and / or flaws in methodology concerning verification 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
1	12 Crew Misjudge Situation	TO10B212	The flight crew diagnoses the situation, realising what is causing the pitch control problems but misjudges the situation and incorrectly aborts the take-off when the aircraft is 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				Wildlife incursion	5
5				System failure affecting the operation of primary instruments / displays or standby 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
10				Maintenance technician / airworthiness specialist tiredness - Inadequate workload 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
16				Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201
17				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216
18				Incorrect stab-trim setting	258
19				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
20				Slow rotation (i.e., low pitch rate)	371
21				Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401
22				Lack of adherence to SOP for take-off procedure in terms of speed bug checklist preparation and verification.	419
23				Inadequate certification process and / or flaws in methodology concerning verification 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

Base events	Code	Definition	Identifiable precursors	No.
26			Flaws in aircraft system maintenance process definition - Landing gear components.	377
27			Flaws in manufacturer quality control process - Landing gear components.	376
1	13	Take-off rejected correctly when below V1	TO10B22	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.
2			not identifiable at that level	
3			Wildlife incursion	5
4			System failure affecting the operation of primary instruments / displays or standby instruments	26
5			Bird strike	34
6			Contaminated Runway	39
7			Tire burst	80
8			Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
9			Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
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			Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162
12			Pilot tiredness - Inadequate workload distribution	167
13			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 configuration.	198
15			Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201
16			Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216
17			Incorrect stab-trim setting	258
18			Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
19			Slow rotation (i.e., low pitch rate)	371
20			Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401
21			Lack of adherence to SOP for take-off procedure in terms of speed bug checklist preparation and verification.	419
22			Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FCS system or components	420
23			Flaws in manufacturer quality control process - FCS system components	421
24			Flaws in aircraft system maintenance process definition - FCS systems or components	422
25			Flaws in aircraft system maintenance process definition - Landing gear components.	377
26			Flaws in manufacturer quality control process - Landing gear components.	376
III+ HII	III	Failure to achieve maximum braking		Failure to achieve maximum braking
1	14	Insufficient Runway Length	TO10B31	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.
2			Convective weather - heavy rain resulted with wet RWY surface	75
3			Pilot tiredness - Inadequate workload distribution	167
4			Flaws in pilot requirements definition process and/or training methodology	168
5			Gross error in takeoff weight entry and/or in V1 / VR speeds assessment	179
6			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
7			High energy RTO rate is an indicator of improper Operator's policy for T/O operations.	211
8			Poor application of T/O & RTO procedure, computation of T/O parameters	260
9			Wildlife incursion	5
10			System failure affecting the operation of primary instruments / displays or standby instruments	26
11			Bird strike	34
12			Contaminated Runway	39
13			Tire burst	80
14			Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
15			Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
16			Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
17			Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162
18			Pilot tiredness - Inadequate workload distribution	167
19			Flaws in pilot requirements definition process and/or training methodology	168
20			Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.	198
21			Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201
22			Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216
23			Incorrect stab-trim setting	258
24			Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
25			Slow rotation (i.e., low pitch rate)	371
26			Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401
27			Lack of adherence to SOP for take-off procedure in terms of speed bug checklist preparation and verification.	419

	Base events	Code	Definition	Identifiable precursors	No.
27				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FCS system or components	420
28				Flaws in manufacturer quality control process - FCS system components	421
29				Flaws in aircraft system maintenance process definition - FCS systems or components	422
30				Flaws in aircraft system maintenance process definition - Landing gear components.	377
31				Flaws in manufacturer quality control process - Landing gear components.	376
32				Pilot tiredness - Inadequate workload distribution	167
33				Flaws in pilot requirements definition process and/or training methodology	168
34				Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207
35				Poor application of T/O & RTO procedure, failure recognition and preparedness	209
1	15 Brakes not functioning correctly	TO10B32	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				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 distribution	150
5				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216
6				Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake).	366
7				Wildlife incursion	5
8				System failure affecting the operation of primary instruments / displays or standby instruments	26
9				Bird strike	34
10				Contaminated Runway	39
11				Tire burst	80
12				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
13				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
14				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
15				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162
16				Pilot tiredness - Inadequate workload distribution	167
17				Flaws in pilot requirements definition process and/or training methodology	168
18				Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.	198
19				Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201
20				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216
21				Incorrect stab-trim setting	258
22				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
23				Slow rotation (i.e., low pitch rate)	371
24				Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring.	401
25				Lack of adherence to SOP for take-off procedure in terms of speed bug checklist preparation and verification.	419
26				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FCS system or components	420
27				Flaws in manufacturer quality control process - FCS system components	421
28				Flaws in aircraft system maintenance process definition - FCS systems or components	422
29				Flaws in aircraft system maintenance process definition - Landing gear components.	377
30				Flaws in manufacturer quality control process - Landing gear components.	376
31				Pilot tiredness - Inadequate workload distribution	167
32				Flaws in pilot requirements definition process and/or training methodology	168
33				Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207
34				Poor application of T/O & RTO procedure, failure recognition and preparedness	209
1	16 Brakes not applied correctly	TO10B33	Failure of the flight crew to apply all the braking systems immediately after take-off 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, braking initiation sequence	199
4				Wildlife incursion	5
5				System failure affecting the operation of primary instruments / displays or standby 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
10				Maintenance technician / airworthiness specialist tiredness - Inadequate workload 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
16				Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201

	Base events	Code	Definition	Identifiable precursors	No.
17				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216
18				Incorrect stab-trim setting	258
19				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
20				Slow rotation (i.e., low pitch rate)	371
21				Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401
22				Lack of adherence to SOP for take-off procedure in terms of speed bug checklist preparation and verification.	419
23				Inadequate certification process and / or flaws in methodology concerning verification 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	168
30				Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207
31				Poor application of T/O & RTO procedure, failure recognition and preparedness	209
IV+					
I	IV	Aircraft fails to rotate and lift off		Aircraft fails to rotate and lift off	
1	17	Pitch Control Misdiagnosed	TO10B41	Flight crew fail to diagnose the cause of the pitch control problems and hence fails to rectify the problem.	
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, aircraft handling	388
5				Wildlife incursion	5
6				System failure affecting the operation of primary instruments / displays or standby instruments	26
7				Bird strike	34
8				Contaminated Runway	39
9				Tire burst	80
10				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
11				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
12				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
13				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162
14				Pilot tiredness - Inadequate workload distribution	167
15				Flaws in pilot requirements definition process and/or training methodology	168
16				Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.	198
17				Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201
18				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216
19				Incorrect stab-trim setting	258
20				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
21				Slow rotation (i.e., low pitch rate)	371
22				Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401
23				Lack of adherence to SOP for take-off procedure in terms of speed bug checklist preparation and verification.	419
24				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FCS system or components	420
25				Flaws in manufacturer quality control process - FCS system components	421
26				Flaws in aircraft system maintenance process definition - FCS systems or components	422
27				Flaws in aircraft system maintenance process definition - Landing gear components.	377
1	18	Unsuccessful Pitch Control Rectification	TO10B42	Flight crew diagnoses the causes of the pitch control problem but fails to rectify it	
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, aircraft handling	388
5				Wildlife incursion	5
6				System failure affecting the operation of primary instruments / displays or standby instruments	26
7				Bird strike	34
8				Contaminated Runway	39
9				Tire burst	80
10				Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149
11				Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150
12				Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151
13				Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162
14				Pilot tiredness - Inadequate workload distribution	167
15				Flaws in pilot requirements definition process and/or training methodology	168
16				Lack of adherence to SOP for take-off procedure in terms of determining of aircraft configuration.	198

	Base events	Code	Definition	Identifiable precursors	No.
16				Lack of adherence to SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201
17				Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216
18				Incorrect stab-trim setting	258
19				Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358
20				Slow rotation (i.e., low pitch rate)	371
21				Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401
22				Lack of adherence to SOP for take-off procedure in terms of speed bug checklist preparation and verification.	419
23				Inadequate certification process and / or flaws in methodology concerning verification 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

Base events	Code	Definition	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
ESD 35 Base events	Code	Definition	Technology	Human	Organisation	System of Organisations
I Flight crew decision error /operation of equipment error						
1 Ground navaid failure causes ITC	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.		15; 16; 17; 23; 25	26; 27; 33; 35; 36; 37; 38; 39;	50; 51; 56; 57; 59; 60; 61; 62; 63
2 On-board nav equipment failure causes ITC	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.	3;	15; 16; 17; 21; 23; 25	26; 27; 33; 35; 36; 37; 38; 39;	50; 51; 56; 57; 59; 60; 61; 62; 63
3 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.		15; 16; 17; 18; 21; 23; 25	26; 27; 31; 33; 35; 36; 37; 38; 39;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63
4 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 flight towards terrain.		15; 16; 17; 23;	26; 35; 36; 37; 38; 39;	50; 51; 56; 57; 59; 60; 61; 62; 63
5 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 nav aids and ATC clearances.		15; 16; 17; 18; 20; 21; 23;	26; 27; 32; 33; 34; 35; 36; 37; 38; 39;	50; 51; 56; 57; 59; 60; 61; 62; 63
6 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.		15; 16; 17; 23; 25	26; 27; 36; 37; 38; 39;	48; 50; 51; 59; 60; 61; 62; 63
7 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.		15; 16; 17; 18; 20; 23; 25	26; 27; 36; 37; 38; 39;	50; 51; 56; 57; 59; 60; 61; 62; 63
8 Incorrect trajectory conflicts with terrain	AL35F53	Given an ITC is executed by pilot, the trajectory is in conflict with terrain		15; 16; 17; 20; 23;	26; 36; 37; 38; 39;	48; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
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.	3;	15; 16; 17; 18; 20; 21; 23; 25	26; 27; 31; 33; 35; 36; 37; 38; 39;	50; 51; 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
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.	3;	15; 16; 17; 18; 20; 21; 23; 25	26; 27; 31; 33; 35; 36; 37; 38; 39;	50; 51; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
11 False ILS capture causes ITC	AL35F6213	Given an FMS trajectory command during approach, an ITC is executed due to false ILS capture.		15; 16; 17; 20; 23;	26; 37; 38; 39;	50; 51; 59; 60; 61; 62; 63
12 FMS nav database error causes ITC	AL35F6214	Given an FMS trajectory command during approach, an ITC is executed due to FMS database error.	3;	15; 16; 17; 18; 21; 24; 25	26; 27; 31; 33; 37; 38; 39;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63
13 FMS fault causes ITC	AL35F622	Given an FMS trajectory command during approach, an ITC is executed due to FMS hardware or software fault.	3;	15; 16; 17; 18; 21; 24; 25	26; 27; 31; 33; 37; 38; 39;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63
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.		15; 16; 17; 18; 21; 24; 25	26; 27; 31; 33; 37; 38; 39;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63
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 manoeuvres it is not intended to.		15; 16; 17; 18; 21; 24; 25	26; 27; 31; 33; 37; 38; 39;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63
16 Incorrect trajectory conflicts with terrain	AL35F63	Given an ITC is executed by FMS, the trajectory is in conflict with terrain		15; 16; 17; 20; 23;	26; 36; 37; 38; 39;	48; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
17 Inadequate trajectory command (ITC) by ATCO	AL35F721	Given 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; 57; 59; 60; 61; 62; 63
18 Inadequate communication with pilot	AL35F722	Given an ATC trajectory 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; 56; 57; 59; 60; 61; 62; 63
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 readback.		15; 16; 17; 18; 20; 21; 23;	26; 36; 37; 38; 39;	50; 51; 59; 60; 61; 62; 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; 55; 58; 59; 60; 61; 62; 63
II 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).	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
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).	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
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).	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
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.	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
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.	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
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; 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
27 Inexperienced PNF not monitoring PF	AL35B4124	Given an FTTC, PNF fails to detect it due to being inexperienced and not performing independent monitoring of the more experienced PF.	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

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 recognise the trajectory command is incorrect.	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
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 concerns to the PF.	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
30 PNF superior and silent	AL35B432	Given an FTTC, the PNF recognises the error, but fails to communicate this in order to test or train the PF.	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
31 Press-on-itis	AL35B441	Given an FTTC, PNF expresses concerns about the trajectory command but the pilot continues without correcting it	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
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 it	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
III Flight crew loss of situation awareness						
33 Imminent CFIT above decision height (DH)	AL35C2	An imminent CFIT occurs when aircraft is above the decision height	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
34 Low visibility over terrain	AL35B2111	Given an imminent CFIT above decision height (DH), the terrain ahead is in effect invisible due to cloud, fog etc	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
35 Dark terrain	AL35B2112	Given an imminent CFIT above DH, the terrain ahead is in effect invisible due to darkness combined with lack of illumination on the terrain.	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
36 Flight crew fail to see visible terrain	AL35B212	Given an imminent CFIT above DH with visible terrain ahead, flight crew fail to see the terrain in time to avoid an imminent CFIT.	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
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.	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
38 Imminent CFIT at decision height	AL35C3	An imminent CFIT occurs when aircraft is at decision height	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
39 Unsuccessful missed approach procedure	AL35B22A	Given an imminent CFIT below DH, flight crew fail to avoid an imminent CFIT by making a missed approach.	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
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).	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
41 Unsuccessful ATCO monitoring of TAR	AL35B321	Given a CFTT with TAR available, ATCO fails to detect in time to be able to prevent an imminent CFIT.	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
42 No MSAW available	AL35B3221	Given a CFTT with TAR available, minimum safe altitude warning (MSAW) is not available.	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
43 MSAW failure to give warning in time	AL35B3222	Given a CFTT with TAR and MSAW available, MSAW does not give a warning in time to be able to prevent an imminent CFIT.	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
44 ATCO failure to respond to MSAW warning	AL35B3223	Given a CFTT with MSAW warning, ATCO does not respond in time to be able to prevent an imminent CFIT.	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
45 ATCO failure to resolve conflict in time	AL35B33	Given a CFTT with ATCO alerted by an MSAW warning, ATCO and flight crew do not correct trajectory in time to prevent an imminent CFIT.	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
IV GPWS failure						
46 GPWS not installed	AL35B11	Given an imminent CFIT, the aircraft is not fitted with GPWS.	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
47 No GPWS warning in time	AL35B12	Given an imminent CFIT on an aircraft fitted with GPWS, the GPWS does not give an appropriate warning in time for avoidance action.	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

Base events	Code	Definition	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
ESD 32 Incorrect presence of aircraft/vehicle on runway in use	Code	Definition	Technology	Human	Organisation	System of Organisations
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		11; 19; 22;	43; 44	45; 50; 51; 52; 53; 56; 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 instructions	TO32B422	Pilots or vehicle driver fail to follow the runway entry instruction from ATCO, causing a runway incursion		11; 19; 22;	43; 44	45; 50; 51; 52; 53; 59; 60; 61; 62; 63
6 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		11; 19; 22;	43; 44	45; 50; 51; 52; 53; 56; 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; 62; 63
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	45; 46; 48; 50; 51; 52; 53; 56; 57; 59; 60; 61; 62; 63
11 Flight crew lost on airport	TO32B4111211	Pilots or vehicle driver lose knowledge of aircraft position and hence fail to supply adequate position report to ATCO		11; 12; 19; 22;	43; 44	45; 46; 48; 50; 51; 52; 53; 56; 57; 59; 60; 61; 62; 63
12 ATCO failure to clarify position reports	TO32B4111212	ATCO fails to clarify the incorrect position report by pilots or vehicle driver		11; 12; 19; 22;	43; 44	45; 46; 48; 50; 51; 52; 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 unintentionally 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; 58; 59; 60; 61; 62; 63
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	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; 58; 59; 60; 61; 62; 63
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	45; 46; 47; 48; 50; 51; 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
23 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	45; 46; 47; 48; 50; 51; 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
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	45; 46; 47; 48; 50; 51; 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
25 Restricted view from tower prevents conflict detection	TO32B113	ATCO fails to detect a conflict and give warning due to the restricted view from tower		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
26 ATCO failure to see visible aircraft in time	TO32B114	ATCO fails to detect a conflict and give warning due to ATCO's failure to see the aircraft		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
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; 58; 59; 60; 61; 62; 63
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	45; 46; 47; 48; 50; 51; 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
ESD 36 Ground collision imminent	Code	Definition	Technology	Human	Organisation	System of 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; 53; 54; 55; 58; 59; 60; 61; 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 (e.g. brake failure)		12; 19;	44	46; 50; 51; 59; 60; 61; 62; 63
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; 53; 54; 55; 59; 60; 62; 63
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; 58; 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; 53; 54; 55; 58; 59; 60; 61; 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; 60; 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; 59; 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; 61; 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; 61; 62; 63
10 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; 58; 59; 60; 61; 62; 63
11 Pushback deviation creates conflict	TO36F122	Deviation from the intended pushback trajectory causes imminent collision		12; 19;	44	46; 50; 51; 59; 60; 61; 62; 63
12 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; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
13 Ground crew error in marshalling off stand	TO36F1312	Deviation from intended taxi trajectory due to marshalling error		12; 19;	44	46; 50; 51; 52; 53; 59; 60; 62; 63
14 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; 52; 53; 54; 55; 59; 60; 61; 62; 63
15 Movement of other aircraft deviates from procedures	TO36F1314	Deviation from intended taxi trajectory by another taxiing aircraft		12; 19;	44	46; 48; 50; 51; 54; 55; 59; 60; 61; 62; 63
16 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; 52; 53; 59; 60; 61; 62; 63
17 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; 52; 53; 54; 55; 59; 60; 62; 63
18 Inadequate stand allocation	TO36F1412	Allocation of wrong stand for aircraft			44	50; 51; 52; 53; 54; 55; 59; 60; 61; 62; 63
19 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; 55; 58; 59; 60; 61; 62; 63
20 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; 58; 59; 60; 61; 62; 63
21 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; 61; 62; 63
22 Ground crew error marshalling onto stand	TO36F14134	Deviation from intended taxi-in trajectory due to marshalling error		12; 19;	44	46; 48; 50; 51; 52; 53; 54; 55; 59; 60; 61; 62; 63
23 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; 52; 53; 54; 55; 59; 60; 61; 62; 63
24 Ground equipment fault	TO36F14142	Deviation from intended taxi-in trajectory due to ground equipment fault		12; 19;	44	46; 50; 51; 59; 60; 61; 62; 63
25 Taxi-in deviation creates conflict	TO36F142	Deviation from the intended taxi-in trajectory causes imminent collision		12; 19;	44	46; 48; 50; 51; 59; 60; 61; 62; 63
26 Avoidance impracticable for flight crew	TO36B21	Conflict cannot be avoided by flight crew	5; 7; 9;	12; 19;	44	46; 48; 50; 51; 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
27 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; 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
28 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; 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
29 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; 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
30 Avoidance impracticable for ground crew	TO36B11	Conflict cannot be avoided by ground crew	5; 7; 9;	12; 19;	44	46; 48; 50; 51; 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
31 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	46; 48; 50; 51; 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
32 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	46; 48; 50; 51; 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
33 Inadequate ground crew - flight crew communication	TO36B14	Ground crew fail to communicate with flight crew as necessary to avoid conflict	5; 7; 9;	12; 19;	44	46; 48; 50; 51; 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63

Base events		Code	Definition	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
ESD	Base events	Code	Definition	Technology	Human	Organisation	System of Organisations
I	Incorrect configuration						
1	Unsuccessful TO configuration checklist	TO05B111	Co-pilot fails to determine the position of the flap and slats required for a successful take-off		13; 22;	38; 41;	50; 51; 54; 55; 58; 59; 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 the stand		13; 22;	38; 41;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63
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; 59; 60; 61; 62; 63
5	Verification unsuccessful	TO05B22	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						
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; 59; 60; 61; 62; 63
7	Unsuccessful Maintenance	TO05B312	TOCW system fails due to unsuccessful maintenance and hence the take-off is not rejected	3;	13; 22;	38; 41;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63
8	Unsuccessful Operation	TO05B313	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 circuit breaker following testing		13; 22;	38; 41;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63
9	Unsuccessful Manufacture	TO05B321	TOCW power supply fails due to unsuccessful manufacture and hence the take-off is not rejected	2;	13; 22;	38; 41;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63
10	Unsuccessful Maintenance	TO05B322	TOCW power supply fails due to unsuccessful maintenance and hence the take-off is not rejected	2;	13; 22;	38; 41;	50; 51; 54; 55; 58; 59; 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	TO05B412	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 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 probability.		13; 22;	38; 41;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63
IV	Failure to achieve maximum braking						
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	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 immediately after take-off rejection.		13; 22;	28; 29; 30; 38; 41;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63
V	Aircraft stalls after rotation						
17	Brakes not applied correctly	TO05B53	Failure of the flight crew to apply all the braking systems immediately after take-off rejection.	2; 3;	13; 22;	38; 41;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63
19	Pilot ignores stickshaker	TO05B622	Flight crew take no action to the activated stick-shaker	2; 3;	13; 22;	38; 41;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63
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; 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; 58; 59; 60; 61; 62; 63
VI	Flight crew fails to regain control						
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; 58; 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; 58; 59; 60; 61; 62; 63
24	Incorrect Control	TO05B73	The pilot applies incorrect control to the aircraft. This can be due to improper training, stress and fatigue	2; 3; 6;	13; 22;	38; 41;	48; 50; 51; 54; 55; 58; 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; 58; 59; 60; 61; 62; 63
I	Pre-Service De-icing Failure						
1	icing conditions	TO06B11	Condition of weather being conducive to ice accumulation on aircraft		13;	41;	48; 50; 51; 54; 55; 59; 60; 61; 62; 63
2	Aircraft already in service	TO06B121	Aircraft is already in service and hence will not undergo a pre-service de-icing procedure		13;	41;	48; 50; 51; 54; 55; 59; 60; 61; 62; 63
3	Aircraft entering service	TO06B1221	Aircraft entering service and hence undergo a pre-service de-icing procedure		13;	41;	48; 50; 51; 54; 55; 59; 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 are free of contaminants or unwanted effects caused by de-icing		13;	41;	48; 50; 51; 54; 55; 59; 60; 61; 62; 63
II	Pre-flight De-icing Failure						
5	Lack of pre-flight ice inspection	TO06B211	Flight crew fail to perform a visual and tactile inspection, due to the crew's belief that the conditions are not conducive to icing, lack of expectation		13;	41;	48; 50; 51; 54; 55; 59; 60; 61; 62; 63
6	Unsuccessful pre-flight ice inspection	TO06B212	Flight crew perform a pre-flight inspection but the inspection is inadequate and the contamination is not observed		13;	41;	48; 50; 51; 54; 55; 59; 60; 61; 62; 63
7	De-icing Failure	TO06B22	Aircraft is not de-iced properly following the detection of contamination pre-flight		13;	41;	48; 50; 51; 54; 55; 59; 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; 59; 60; 61; 62; 63
9	Holdover properties inadequate	TO06B232	Properties of the de-icing/ anti-icing fluid are inappropriate such that the Holdover time (HOT) is less than the time required to take-off		13;	41;	48; 50; 51; 54; 55; 59; 60; 61; 62; 63
10	Severe Weather	TO06B233	Weather is severe enough such that ice accumulates rapidly following de-icing/ anti-icing		13;	41;	48; 50; 51; 54; 55; 59; 60; 61; 62; 63
III	Post Push-Back De-icing Failure						

11	Lack of observation	TO06B311	Flight crew fail to perform a visual inspection from inside the aircraft	13;	41;	48; 50; 51; 54; 55; 59; 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; 59; 60; 61; 62; 63
13	De-icing Failure	TO06B32	Aircraft is not de-iced properly following the detection of contamination post push-back	13;	41;	48; 50; 51; 54; 55; 59; 60; 61; 62; 63
14	ATC Delay	TO06B331	Aircraft is delayed by ATC such that ice re-accumulates	13;	41;	48; 50; 51; 54; 55; 59; 60; 61; 62; 63
15	Holdover properties inadequate	TO06B332	Properties of the de-icing/ anti icing fluid are inappropriate such that the HOT is less than the time required to take-off	13;	41;	48; 50; 51; 54; 55; 59; 60; 61; 62; 63
16	Severe Weather	TO06B333	Weather is severe enough such that ice accumulates rapidly following de-icing/ anti-icing	13;	41;	48; 50; 51; 54; 55; 59; 60; 61; 62; 63
	IV Aircraft stalls after rotation					
17	Stall Unavoidable	TO06B41	No input to controls will allow the flight crew to avoid the stall	13;	41;	48; 50; 51; 54; 55; 59; 60; 61; 62; 63
18	Stick-Shaker failure	TO06B4211	Stick-shaker fails due to improper manufacture or maintenance	13;	41;	48; 50; 51; 54; 55; 59; 60; 61; 62; 63
19	Stall AOA too low	TO06B4212	Stall occurs at an AOA that is less than the AOA required to activate the stick-shaker	13;	41;	48; 50; 51; 54; 55; 59; 60; 61; 62; 63
20	Pilot ignores stickshaker	TO06B422	Flight crew take no action to the activated stick-shaker	13;	41;	48; 50; 51; 54; 55; 59; 60; 61; 62; 63
	I Flight crew fails to detect windshear					
1	LLWAS not installed	TO08B111	A low-level windshear alert system is not installed at the departure airport, given that a windshear encounter occurs	22;	36; 37; 39;	48; 50; 51; 54; 55; 58; 59; 60; 61; 62;
2	LLWAS not activated	TO08B112	The LLWAS fails to activate, e.g. due to inadequacies in the software used by the system to predict windshear or a failure of the system as a whole	22;	36; 37; 39;	48; 50; 51; 54; 55; 58; 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; 58; 59; 60; 61; 62;
4	PWS not installed	TO08B121	Aircraft does not have a predictive windshear system (PWS) installed	22;	36; 37; 39;	48; 50; 51; 54; 55; 58; 59; 60; 61; 62;
5	PWS not activated	TO08B122	PWS fails to activate, e.g. due to inadequacies in the software used by the system to predict windshear or a failure of the system as a whole	22;	36; 37; 39;	48; 50; 51; 54; 55; 58; 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; 58; 59; 60; 61; 62;
	II Flight crew fails to perform windshear escape manoeuvre					
7	Failure to avoid windshear	TO08B21	Windshear is detected by any of the systems available but the aircraft cannot avoid the windshear	22;	36; 37; 39;	48; 50; 51; 54; 55; 58; 59; 60; 61; 62;
8	Aircraft too low	TO08B221	Aircraft is too close to the ground immediately after take-off and the windshear encountered is such that is impossible to successfully perform and execute a windshear escape manoeuvre	22;	36; 37; 39;	48; 50; 51; 54; 55; 58; 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; 58; 59; 60; 61; 62;
	III Flight crew fails to maintain control					
10	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; 58; 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; 58; 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; 58; 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; 58; 59; 60; 61; 62;
	I Fire on-board aircraft					
1	Cargo in Hightened Flammable State	ER11B11	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	9;		50; 51; 54; 55; 58; 59; 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
3	Unsuccessful Maintenance Revealed	ER11B1212	A leak of fuel from the fuel system, due to previous unsuccessful maintenance	4;		50; 51; 55; 56; 59; 60; 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; 60; 61; 62; 63
5	Flammable Vapour in Fuel Tank	ER11B122	Excessive flammable vapour within in the fuel tank that, when ignited, results in an explosion within the tank	4;		50; 51; 55; 56; 59; 60; 61; 62; 63
6	Hydraulic Fluids in Hightened Flammable State	ER11B13	A leak of hydraulic fluid that, when ignited, results in a fire in flight	5;		50; 51; 55; 56; 59; 60; 61; 62; 63
7	Aircraft Equipment in Hightened Flammable State	ER11B14	Components parts of aircraft that are unusually vulnerable to fire, e.g. incorrectly inflated tyres, incorrectly installed wiring, inadequately specified insulation.	2; 7;		50; 51; 55; 56; 59; 60; 61; 62; 63
8	Engine Overheats	ER11B15	Any part of the engine overheats, causing a fire	9;		50; 51; 55; 56; 59; 60; 61; 62; 63
9	APU Overheats	ER11B16	The auxiliary power unit (APU) overheats, causing a fire	9;		50; 51; 55; 56; 59; 60; 61; 62; 63
10	Electrical Event results in ignition	ER11B21	Ignition is caused by an electrical fault	2;		50; 51; 55; 56; 59; 60; 61; 62; 63
11	Excessive Heat Transfer results in Ignition	ER11B22	Ignition is caused by heating of flammable materials			50; 51; 55; 56; 59; 60; 61; 62; 63
	II Flight crew fails to detect smoke/fire					
12	Fire Detection System Failure	ER11B31	Failure in the on-board fire detection system, thus preventing the flight crew extinguishing the fire in time to prevent propagation	2; 4; 5; 7; 9;	11; 15; 16; 18; 19; 20; 21; 22;	31; 32; 33; 34; 35; 36; 37; 38; 39; 43; 44
13	Fire Warning System Failure	ER11B32	Failure in the on-board fire warning system, thus preventing the flight crew extinguishing the fire in time to prevent propagation	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
14	No Detection/Warning System Available	ER11B33	No on-board detection/ warning system is available at the location of the fire	2; 4; 5; 7; 9;	11; 15; 16; 18; 19; 20; 21; 22;	31; 32; 33; 34; 35; 36; 37; 38; 39; 43; 44
15	Fire Detection Impractical	ER11B34	An explosion or a fire that propagates so rapidly that initial detection is impractical.	2; 4; 5; 7; 9;	11; 15; 16; 18; 19; 20; 21; 22;	31; 32; 33; 34; 35; 36; 37; 38; 39; 43; 44
	III Flight crew fails to extinguish fire					

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 Extinguishing 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 Extinguishing 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; 62; 63
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	45; 50; 51; 52; 53; 54; 55; 56; 58; 59; 60; 61; 62; 63
21	Incorrect Operation of Fire Extinguishing System	ER11B44	Flight crew are aware of the fire but fail to operate the fire extinguishing system correctly and hence the fire is not extinguished	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
22	Fire Extinguishing System Insufficient	ER11B45	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	45; 50; 51; 52; 53; 54; 55; 56; 58; 59; 60; 61; 62; 63
23	Fire Extinguishing 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
IV Fire propagates							
24	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; 62; 63
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	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
V Flight crew fail to maintain control							
27	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; 61; 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
II Flight crew fails to maintain control							
9	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
18	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
19	Crew unaware of how to use autopilot	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
20	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
I 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	Given an extreme attitude where recovery action is possible, that the flight crew fail to attempt any recovery.	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	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; 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

Appendix B - Step 7 - LOC-I

Linking of
CATS ESD Base Events and 63 ASCOS SPIs



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
II Flight control system failure							
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
6	Uncommanded rudder deflection	ER13F312	Rudder deflects without commands from flight crew, due to rudder failure	5;	13; 14; 22;	38; 41; 42;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63
7	Horizontal stabiliser failure	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; 59; 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; 58; 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;	13; 14; 15; 16; 18; 19; 21; 22;	26; 31; 35; 38; 41; 42;	47; 50; 51; 54; 55; 58; 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; 59; 60; 61; 62; 63
14	Uncommanded thrust	ER13F52	An unintended thrust setting is in execution without commands by flight crew, due to autothrottle failure	9;	13; 14;	26; 38; 41; 42;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63
15	Thrust reverser failure	ER13F61	Failure of the thrust reverser inside engine	9;	13; 14; 21;	38; 41; 42;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63
16	Uncommanded deployment	ER13F62	Thrust reverser deploys without commands by flight crew, due to thrust reverser failure	9;	13; 14; 21;	38; 41; 42;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63
I Flight crew fails to maintain control							
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; 58; 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;	13; 14; 15; 16; 18; 19; 21; 22;	26; 31; 35; 38; 41; 42;	47; 50; 51; 54; 55; 58; 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;	13; 14; 15; 16; 18; 19; 21; 22;	26; 31; 35; 38; 41; 42;	47; 50; 51; 54; 55; 58; 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; 21; 22;	26; 31; 35; 38; 41; 42;	47; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
II Flight crew incapacitation							
4	Medical incapacitation of pilot	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; 61; 62; 63
5	Unsuccessful depressurisation response	ER14B2	Given the flight deck is depressurised, flight crew fails to respond adequately and hence are incapacitated		13; 15; 19; 20; 21;	31; 32; 34; 35; 41;	47; 50; 51; 59; 60; 61; 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; 61; 62; 63
7	Unsuccessful flight deck smoke procedures	ER14B3	Given the presence of toxic gas in flight deck, flight crew fails to respond adequately and hence are incapacitated		13; 15; 19; 20; 21;	31; 32; 34; 35; 41;	47; 50; 51; 59; 60; 61; 62; 63
8	CPCS failure in flight	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; 61; 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; 61; 62; 63
10	Depressurisation due to incorrect CPCS operation	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; 61; 62; 63
11	Door failure in flight	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; 58; 59; 60; 61; 62; 63
12	Depressurisation	ER14F41212	Given a door failure, the flight deck is depressurised		15; 19; 20; 21;	31; 32; 33; 34; 35;	47; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
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;	47; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
14	Depressurisation	ER14F41222	Given a window failure, the flight deck is depressurised		15; 19; 20; 21;	31; 32; 33; 34; 35;	47; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
15	Fuselage failure due to deterioration	ER14F41231	Fuselage fails as a result of deterioration		15; 19; 20; 21;	31; 32; 33; 34; 35;	47; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
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; 37; 38; 39;	47; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
17	Fuselage failure due to tail strike	ER14F41323	Rear of fuselage strike the runway during take-off or landing		15; 19; 20; 21;	31; 32; 33; 34; 35;	47; 49; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
18	Fuselage failure due to impact while on ground	ER14F41324	Impact damage while on the ground, due to taxi collision, ground vehicle impact, etc.		11; 12; 15; 19; 20; 21;	31; 32; 33; 34; 35; 43; 44	45; 46; 47; 48; 49; 50; 51; 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
I Flight crew fails to maintain control							
1	Simultaneous incapacitation of all flight crew	ER14B11	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; 50; 51; 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
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	45; 46; 47; 48; 49; 50; 51; 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
3	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	45; 46; 47; 48; 49; 50; 51; 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
III Ice accretion on aircraft							
9	Icing 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; 58; 59; 60; 61; 62; 63
10	Anti-icing system not used	ER15B32	Anti-icing system is not operating due to flight crew misjudge the icing severity		13; 14; 21;	31; 41; 42;	48; 50; 51; 54; 55; 58; 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; 58; 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 operate the system as intended		13; 14; 21;	31; 40; 41; 42;	48; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
13	Icing exceeding anti-icing capability	ER15B35	Icing condition exceeds the capacity of the anti-icing system		13; 14; 21;	31; 41; 42;	48; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63

14	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; 58; 59; 60; 61; 62; 63
	II Flight crew fails to respond						
5	Ice accretion not detected	ER15B21	No warning is delivered to alert the flight crew of ice accretion on aircraft surface	3; 6;	13; 14; 21;	31; 40; 41; 42;	48; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
6	Lack of response to ice accretion	ER15B22	A warning is delivered but flight crew take no respond action	6;	13; 14; 21;	31; 40; 41; 42;	48; 50; 51; 54; 55; 58; 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; 58; 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; 58; 59; 60; 61; 62; 63
	I Flight crew fails to maintain control						
1	Recovery impractical	ER15B11	Loss of control is too severe or the flight stage is too critical for any effective recovery action	3; 6;	13; 14; 21;	31; 40; 41; 42;	48; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
2	Lack of recovery action	ER15B12	No recovery is attempted in time to recover control, despite there being sufficient time for recovery	3; 6;	13; 14; 21;	31; 40; 41; 42;	48; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
3	Incorrect recovery action	ER15B13	Attempted action is incorrect. This may be because the flight crew are not trained in control recovery	3; 6;	13; 14; 21;	31; 40; 41; 42;	48; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
4	Insufficient recovery action	ER15B14	Recovery action is correct but not enough to recover control	3; 6;	13; 14; 21;	31; 40; 41; 42;	48; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
	II 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; 59; 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; 58; 59; 60; 61; 62; 63
11	Pitot-static ice protection system failure	ER16B31	Ice 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; 58; 59; 60; 61; 62; 63
12	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; 58; 59; 60; 61; 62; 63
13	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; 59; 60; 61; 62; 63
14	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; 59; 60; 61; 62; 63
15	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; 59; 60; 61; 62; 63
16	ADI failure in flight	ER16F321	Attitude Director Indicator (ADI) fails during flight	3;	13; 14; 21;	31; 41; 42;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63
17	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; 59; 60; 61; 62; 63
18	ASI failure in flight	ER16F331	ASI system fails during flight	3;	13; 14; 21;	31; 41; 42;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63
19	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; 59; 60; 61; 62; 63
20	PFD failure in flight	ER16F341	Primary Flight Display (PFD) system fails during flight	1;	22;		48; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
21	ASI anomaly	ER16F342	Given PFD fails during flight, ASI fails to display adequate flight information	1;	22;		48; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
	I Flight crew failure to maintain control						
1	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; 58; 59; 60; 61; 62; 63
2	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; 58; 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; 58; 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; 58; 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; 58; 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; 58; 59; 60; 61; 62; 63
7	Incorrect response to flight instrument failure	ER16B23	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; 58; 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; 58; 59; 60; 61; 62; 63
	I Aircraft encounters adverse weather						
1	Severe Clear Air Turbulence (CAT)	ER17B1111	Severe Clear Air Turbulence (CAT) occurs along the flight route of the aircraft		13; 19; 21;	31; 33; 34; 35; 41;	47; 48; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
2	No indication of severe CAT	ER17B11121	Encounter with severe CAT is completely unexpected		13; 19; 21;	31; 33; 34; 35; 41;	47; 48; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
3	Inadequate information from preceding aircraft	ER17B11122	Flight crew request information from the preceding aircraft but they either give inaccurate information concerning the weather picture or fail to give any information		13; 19; 21;	31; 33; 34; 35; 41;	47; 48; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
4	Encounter too sudden	ER17B11123	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; 55; 58; 59; 60; 61; 62; 63
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 structural damage		13; 19; 21;	31; 33; 34; 35; 41;	47; 48; 50; 51; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
6	Weather report information inadequate	ER17B112211	A weather report is obtained by the flight crew but the information is incorrect, resulting in a turbulence encounter		13; 19; 21;	31; 33; 34; 35; 41;	47; 48; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
7	Flight crew fail to obtain weather reports	ER17B112212	Weather report is not obtained by flight crew and hence weather conditions are not anticipated correctly, resulting in a turbulence encounter		13; 19; 21;	31; 33; 34; 35; 41;	47; 48; 50; 51; 54; 55; 59; 60; 61; 62; 63
8	Onboard weather radar failure	ER17B112213	Failure of on board weather radar system, preventing weather avoidance, resulting in a turbulence encounter		13; 19; 21;	31; 33; 34; 35; 41;	47; 48; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
9	Unsuccessful weather information management	ER17B112214	Flight crew use the on board weather system incorrectly, resulting in a turbulence encounter		13; 19; 21;	31; 33; 34; 35; 40; 41;	47; 48; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
10	Flight crew disregard weather information	ER17B112215	Flight crew receive adequate weather information but do not believe it, resulting in a turbulence encounter		13; 19; 21;	31; 33; 34; 35; 41;	47; 48; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
11	Flight crew commands flight into unfavourable conditions	ER17B112221	Flight into unfavourable weather is commanded voluntarily by the flight crew, resulting in turbulence encounter		13; 19; 21;	31; 33; 34; 35; 41;	47; 48; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63

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; 58; 59; 60; 61; 62; 63
14	Aircraft suffers structural damage	ER17B122	The aircraft suffers structural damage		21;	31;	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 the cabin		21;	31;	48; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
16	Flight crew fail to secure cabin	ER17B12312	Flight crew fail to alert the passengers and cabin crew as to the necessity of securing the cabin		21;	31;	48; 50; 51; 54; 55; 58; 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; 59; 60; 61; 62; 63
18	Occupants suffer significant injury	ER17B1232	Given that the cabin is not secured during the turbulence encounter, the passengers or cabin crew suffer significant injuries		14; 21;	31; 42;	48; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
II Ultimate design load exceeded							
19	Flight crew command extreme manoeuvre	ER17B211	During the encounter with adverse weather, the flight crew voluntarily execute 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
20	Turbulence causes extreme manoeuvre	ER17B212	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
III Flight crew fail to maintain control							
22	Adverse weather makes aircraft uncontrollable	ER17B31	No input to controls will allow the flight crew to maintain control of 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; 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; 62; 63
24	Incorrect control	ER17B33	The pilot applies incorrect or insufficient control to the aircraft, after the aircraft encounters turbulence. This can be due to improper training, stress and fatigue		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
I Single Engine Failure							
1	Reduction Gear Failure	ER18B1111	The failure of the reduction gear 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
2	Severe Failure	ER18B1112	A severe failure occurs given that the reduction gear 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
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;	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
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; 21; 22;	26; 27; 31; 33; 34; 35; 36; 41; 42;	47; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
7	Turbine Failure	ER18B1141	The failure of the turbine 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
8	Severe Failure	ER18B1142	A severe failure occurs given that the turbine 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
9	Oil Distribution System Failure	ER18B1151	The oil distribution system within the jet engine fails leading to a lack of lubrication of the rotating parts	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
10	Severe Failure	ER18B1152	A severe failure occurs given that the oil distribution 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
11	Accessory Drive Failure	ER18B1161	The accessory drive within the jet engine fails preventing the proper working of oil, hydraulic and fuel systems	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
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 the total flight time	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
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 flight crew	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
16	Ice shed from wings enters engine	ER18B121123	Ice accumulated on wings enters the aircraft engine	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
17	Ice impact causes damage to engine	ER18B121131	Ice dislodges from the wing or the nacelle of the engine and impacts upon the fan blades. The damage could also be caused by the impact of hail.	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
18	Ice restricts airflow	ER18B121132	Ice build up within the engine restricts the flow of air into the combustor resulting in a fuel rich mixture within the combustor leading to a flame-out	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
19	Thrust reduction	ER18B121133	Ice either builds up on the fuel inlets reducing the flow of fuel or builds up on the engine pressure ratio (EPR) pilot tubes giving false & high EPR readings that the auto throttle system will counter by reducing the thrust.	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
20	Severe storm conditions	ER18B12121	The occurrence of severe storm conditions as a percentage of the total flight time	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
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 been avoided	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
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 speed	ER18B121232	Flight crew fail to maintain a high enough engine rotational speed (45% of maximum) such that the engine becomes saturated with water.	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
25	Fuel System Maintenance Failure	ER18B122111	The fuel system is not correctly maintained which is revealed by the in-flight failure of said system and the resulting fuel leak	4;	13; 16; 18; 19; 20; 21;	26; 31; 33; 34; 35; 36; 37; 38; 39; 41;	47; 50; 51; 59; 60; 61; 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
27	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; 37; 38; 39; 41;	47; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
28	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 results in fuel starvation if no action is taken	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

Appendix B - Step 7 - LOC-I

Linking of
CATS ESD Base Events and 63 ASCOS SPIs



29	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	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
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 within the aircraft to display any fuel warnings	3;	13; 15; 16; 17; 21;	26; 39;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63
33	ECAM gives insufficient advisory action	ER18B12221122	The advisory given by the ECAM concerning the fuel problem is insufficient to alert the flight crew to the severity of the fuel problem	3; 4;	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
34	ECAM Failure	ER18B12221123	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; 58; 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; 58; 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; 58; 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; 58; 59; 60; 61; 62; 63
38	Crew response inadequate	ER18B12222	The crew understand that a fuel problem will develop yet take inappropriate actions to prevent fuel starvation	4;	13; 16; 18; 19; 20; 21;	26; 31; 33; 34; 35; 36; 37; 39; 41;	47; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
39	Foreign Object Damage	ER18B131	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;	26; 31; 33; 34; 35; 36; 37; 39; 41;	47; 50; 51; 54; 55; 58; 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; 58; 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; 55; 58; 59; 60; 61; 62; 63
42	Load exceeds engine mount design load	ER18B133	Given that the engine mounts safe and defect free the loading on the mount exceeds the ultimate design load. This can be caused by an encounter with severe turbulence.	9;	13; 14; 16; 18; 19; 20; 21;	26; 31; 33; 34; 35; 36; 37; 39; 41; 42;	47; 48; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
43	Turbulent Conditions	ER18B141	The aircraft encounters turbulent air conditions that disrupts the flow of air through the jet engine resulting in an aerodynamic stall and from this a 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; 55; 58; 59; 60; 61; 62; 63
44	Flight crew command altitude outside engine operating envelope	ER18B142	The flight crew command flight to an altitude that is higher than the allowable operating altitude of the jet engines on the aircraft	9;	13; 14; 16; 18; 19; 20; 21;	26; 31; 33; 34; 35; 36; 37; 39; 41; 42;	47; 48; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
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 surge	9;	13; 14; 16; 18; 19; 20; 21;	26; 31; 33; 34; 35; 36; 37; 39; 41; 42;	47; 48; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
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; 55; 58; 59; 60; 61; 62; 63
II	Flight crew fail to restart engine						
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; 54; 55; 58; 59; 60; 61; 62; 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; 54; 55; 58; 59; 60; 61; 62; 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; 54; 55; 58; 59; 60; 61; 62; 63
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; 54; 55; 58; 59; 60; 61; 62; 63
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; 54; 55; 58; 59; 60; 61; 62; 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; 54; 55; 58; 59; 60; 61; 62; 63
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; 54; 55; 58; 59; 60; 61; 62; 63
III	Dual Engine Failure						
54	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; 54; 55; 58; 59; 60; 61; 62; 63
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;	47; 48; 49; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
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;	47; 48; 49; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
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;	47; 48; 49; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
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; 54; 55; 58; 59; 60; 61; 62; 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; 54; 55; 58; 59; 60; 61; 62; 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; 54; 55; 58; 59; 60; 61; 62; 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; 54; 55; 58; 59; 60; 61; 62; 63
62	Further Fuel Monitoring Unsuccessful	ER18B32222	Given that the first engine suffers fuel starvation, the flight crew fail to monitor the fuel situation and diagnose the problem. The second 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; 54; 55; 58; 59; 60; 61; 62; 63

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; 63
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 engine 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; 63
66	Second Engine separates independently	ER18B3322	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; 63
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;	47; 48; 49; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
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;	47; 48; 49; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
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;	47; 48; 49; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
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 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; 63
71	Engines too damaged	ER18B3512	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; 63
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; 63
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; 63
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; 63
75	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; 63
76	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							
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; 63
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; 63
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; 62; 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; 63
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; 63
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
V Flight crew fails to maintain control							
86	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; 62; 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; 62; 63
89	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; 62; 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; 62; 63
VI Flight crew fails to maintain control							
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; 54; 55; 58; 59; 60; 61; 62; 63
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 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
93	Lack of Immediate Flight Control	ER18B62	The flight crew fail to apply any control following the loss of one 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

94	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
VII Aircraft unable to reach airport							
95	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
100	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
I Unstable Approach							
1	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 CRM failure		16; 17;	26; 28; 29; 30;	50; 51; 59; 61; 62;
3	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		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 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		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
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
III 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							
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; 40; 41; 42;	47; 48; 50; 51; 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
17	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
V Flight crew fail to maintain control							
18	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	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
19	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
21	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
VI Failure to achieve maximum braking							
22	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

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
24	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
VIII Flight crew fail to maintain control							
25	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
28	Insufficient control	AL19B74	The pilot applies correct measures after executing a missed approach but are not enough to prevent aircraft leaving off the side of the runway		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
VIII Insufficient fuel available for next approach							
29	Flight crew fail to notify ATC of inadequate reserves	AL19B811	Flight crew do not inform the ATC that the fuel reserve is not sufficient for aircraft to perform the next 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
6	Poor flight planning	AL19B8121	Inadequate amount of reserved fuel in aircraft due to poor flight planning		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
31	Aircraft diverted from other location	AL19B8122	Aircraft consumes extra fuel during flight due to a route diversion		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
32	Aircraft executes multiple MA	AL19B82	Aircraft has already performed one or more missed approach previously, and hence the reserved fuel is not sufficient to perform the next 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
I Aircraft Weight & Balance Outside Limits							
1	Aircraft Overweight	AL21B11	Weight of the aircraft exceeds the take-off limit		13; 14; 18; 22;	31; 39; 41; 42;	50; 51; 52; 53; 54; 55; 59; 60; 61; 62; 63
2	Incorrect or No Load Sheet	AL21B121	The load sheet at take-off is incorrect or no load sheet is presented		13; 14; 18; 22;	31; 39; 41; 42;	50; 51; 52; 53; 54; 55; 59; 60; 61; 62; 63
3	Load Sheet not Adhered to	AL21B122	The loading sheet is not adhered to before take-off and the load is incorrectly distributed in the load		13; 14; 18; 22;	31; 39; 41; 42;	50; 51; 52; 53; 54; 55; 59; 60; 61; 62; 63
4	Fore-Aft Tanks Installed on Aircraft	AL21B131	Fuel tanks are fitted at fore and aft ends of aircraft, which enable fuel to be transferred along length of the plane		13; 14; 18;	39; 41; 42;	50; 51; 52; 53; 54; 55; 59; 60; 61; 62; 63
5	Flight Crew Command Fuel Transfer	AL21B1321	Flight crew command an incorrect fuel transfer leading to a weight and balance problem		13; 18; 21;	31; 33; 34; 35; 36; 37; 39; 41;	47; 50; 51; 54; 55; 58; 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;	47; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
7	Uncommanded Fuel Transfer	AL21B13222	Due to failure of the engine fuel distribution system, fuel is transferred without commendation from flight crew	4; 9;	13; 18; 21;	31; 33; 34; 35; 36; 37; 39; 41;	47; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
8	Fuel Load Distribution Incorrect	AL21B1323	Fuel distribution at take-off is incorrect		13; 14; 18; 21; 22;	31; 35; 36; 37; 39; 41; 42;	47; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
9	Cargo Shifts	AL21B14	Cargo moves in the hold during flight		13; 14; 18; 21; 22;	31; 35; 36; 37; 39; 41; 42;	47; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
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; 42;	47; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
11	Failure to Resolve Problem	AL21B22	Flight crew diagnose the weight and balance problem but do not resolve it. This can be due to the problem being irresolvable, flight crew ignoring the problem or unsuccessful resolution of the problem		13; 14; 18; 21; 22;	31; 35; 36; 37; 39; 41; 42;	47; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
II Flight Crew Fails to Maintain Control							
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; 39; 41; 42;	47; 50; 51; 52; 53; 54; 55; 58; 59; 60; 61; 62; 63
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; 39; 41; 42;	47; 50; 51; 52; 53; 54; 55; 58; 59; 60; 61; 62; 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;	47; 50; 51; 52; 53; 54; 55; 58; 59; 60; 61; 62; 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;	47; 50; 51; 52; 53; 54; 55; 58; 59; 60; 61; 62; 63
16	Incorrect Control	AL21B323	The pilot applies incorrect or insufficient control to the aircraft. This can be due to improper training, stress and fatigue	4; 9;	13; 14; 18; 21; 22;	31; 33; 34; 35; 36; 37; 39; 41; 42;	47; 50; 51; 52; 53; 54; 55; 58; 59; 60; 61; 62; 63

Base events	Code	Definition	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
ESD 31 Base events	Code	Definition	Technology	Human	Organisation	System of Organisations
1 Aircraft are positioned on collision 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 prevent strategic conflict developing into pre-tactical conflict		19;	32; 33; 34; 35;	47; 50; 51; 52; 53; 56; 57; 59; 60; 61; 62; 63
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; 56; 57; 59; 60; 61; 62; 63
4 Inadequate strategic surveillance picture	ER31B9211	The radar picture is inadequate to allow the Planning Controller to identify the pre-tactical conflict, e.g. incomplete traffic picture, picture with overlapping labels, or too much traffic for the display system		19;	32; 33; 34; 35;	47; 50; 51; 52; 53; 56; 57; 59; 60; 61; 62; 63
5 Inadequate flight plan data	ER31B9212	Flight plan data is inadequate to allow the Planning Controller to 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.		19;	32; 33; 34; 35;	47; 50; 51; 52; 53; 56; 57; 59; 60; 61; 62; 63
6 Planning controller failure to recognise conflict	ER31B922	Planning Controller obtain correct flight information but fails to recognise medium-term conflict. This includes failure of MTCD if present		19;	32; 33; 34; 35;	47; 50; 51; 52; 53; 56; 57; 59; 60; 61; 62; 63
7 Planning controller misjudgement of conflict prevention	ER31B923	Planning Controller aware of the conflict but misjudges the traffic situation and results in an inadequate separation plan		19;	32; 33; 34; 35;	47; 50; 51; 52; 53; 56; 57; 59; 60; 61; 62; 63
8 Inadequate planning controller coordination	ER31B93	Planning Controller fails to coordinate with other sectors, resulting in failure to implement planned traffic synchronisation		19;	32; 33; 34; 35;	47; 50; 51; 52; 53; 56; 57; 59; 60; 61; 62; 63
9 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; 56; 57; 59; 60; 61; 62; 63
10 Inadequate tactical surveillance picture	ER31B5111	The radar picture is inadequate to allow the Tactical Controller to maintain separation in a plannable conflict, e.g. incomplete traffic picture or picture with overlapping labels		19;	32; 33; 34; 35;	47; 50; 51; 52; 53; 56; 57; 59; 60; 61; 62; 63
11 Inadequate flight plan data	ER31B5112	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 obtained too late, or aircraft not following flight plan.		19;	32; 33; 34; 35;	47; 50; 51; 52; 53; 56; 57; 59; 60; 61; 62; 63
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; 56; 57; 59; 60; 61; 62; 63
13 ATCO misjudgement in tactical separation	ER31B513	Tactical Controller recognises the conflict, but misjudges the traffic situation and hence makes incorrect clearances or separation instructions to the aircraft		19;	32; 33; 34; 35;	47; 50; 51; 52; 53; 56; 57; 59; 60; 61; 62; 63
14 Inadequate ATCO co-ordination	ER31B514	Tactical Controller fails to coordinate with other controllers, resulting in incorrect clearances or separation instructions		19;	32; 33; 34; 35;	47; 50; 51; 52; 53; 56; 57; 59; 60; 61; 62; 63
15 Inadequate ATCO transmission of instructions	ER31B521	Inadequate transmission of instruction from ATCO, e.g. incorrect clearance, late clearance and unclear phraseology		19; 20;	32; 33; 34; 35;	47; 50; 51; 52; 53; 56; 57; 59; 60; 61; 62; 63
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; 58; 59; 60; 61; 62; 63
17 Inadequate pilot readback	ER31B523	Failure of adequate readback from pilot and failure of ATCO to challenge the failure		19; 20; 21;	31; 32; 33; 34; 35;	47; 50; 51; 56; 57; 59; 60; 61; 62; 63
18 Inadequate pilot response to ATC	ER31B53	Flight crew fail to follow the clearances or separation instructions		19; 20; 21;	31; 32; 33; 34; 35;	47; 50; 51; 59; 60; 61; 62; 63
19 Conflict due to military traffic	ER31F6111	Unauthorised penetration of controlled airspace by military traffic		19; 20; 21;	31; 32; 33; 34; 35;	47; 50; 51; 56; 57; 58; 59; 60; 61; 62; 63
20 Conflict due to VFR traffic	ER31F6112	Unauthorised penetration of controlled airspace by VFR (Visual Flight Rule) traffic		19; 20; 21;	31; 32; 33; 34; 35;	47; 50; 51; 56; 57; 58; 59; 60; 61; 62; 63
21 Inadequate ATCO transmission of instructions	ER31F61211	Inadequate transmission of instruction from ATCO that leads to a vertical deviation of the aircraft		19; 20; 21;	31; 32; 33; 34; 35;	47; 50; 51; 56; 57; 59; 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; 58; 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 follow SID or climb/ descent without clearance.		19; 20; 21;	31; 32; 33; 34; 35;	47; 56; 57; 59; 60; 61; 62; 63
24 Altimeter setting error	ER31F6123	Vertical deviation of aircraft due to inadequate altimeter settings		19; 20; 21; 25	27; 31; 32; 33; 34; 35; 39;	47; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
25 Technical failure in autopilot or nav equipment	ER31F6124	Vertical deviation of aircraft due to technical failure in autopilot or navigation equipment	1; 3;	19; 20; 21;	31; 32; 33; 34; 35;	47; 50; 51; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
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; 59; 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; 55; 56; 57; 58; 59; 60; 61; 62; 63
28 Level bust results in conflict	ER31C6	Given a level bust occurs, the aircraft has separation infringement with another aircraft		19; 21;	31; 32; 33; 34; 35;	47; 48; 50; 51; 56; 57; 58; 59; 60; 61; 62; 63
29 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; 56; 57; 58; 59; 60; 61; 62; 63
30 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; 59; 60; 61; 62; 63
31 Inadequate ATCO transmission of instructions	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; 59; 60; 61; 62; 63
32 Loss of communication	ER31B622	Communication between ATCO and pilot is lost during an unplannable conflict due to technical failure or human error		19; 20; 21;	31; 32; 33; 34; 35;	47; 50; 51; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
33 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; 59; 60; 61; 62; 63
34 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; 59; 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; 59; 60; 61; 62; 63
36 Ineffective tactical separation of ATCO induced conflict	ER31B7	ATCO does not recognise or resolve the conflict they have created		19; 20; 21;	31; 32; 33; 34; 35;	47; 50; 51; 56; 57; 59; 60; 61; 62; 63

Base events	Code	Definition	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
37 Conflict in uncontrolled airspace	ER31F81	A conflict occurs in uncontrolled airspace where separation is the responsibility of the pilot		18; 19; 20; 21;	31; 32; 33; 34; 35;	47; 50; 51; 56; 57; 59; 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 airspace		19; 20; 21;	31; 32; 33; 34; 35;	47; 50; 51; 56; 57; 59; 60; 61; 62; 63
39 Inadequate ATCO transmission of information	ER31B821	Inadequate transmission of traffic information prevents the pilot maintaining separation in uncontrolled airspace		19; 20; 21;	31; 32; 33; 34; 35;	47; 50; 51; 56; 57; 59; 60; 61; 62; 63
40 Loss of communication	ER31B822	Communication between ATCO and pilot is lost during a conflict in uncontrolled airspace due to technical failure or human error		19; 20; 21;	31; 32; 33; 34; 35;	47; 50; 51; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
41 Inadequate pilot readback	ER31B823	Failure of adequate readback from pilot during a conflict in uncontrolled airspace and failure of ATCO to challenge the failure		19; 20; 21;	31; 32; 33; 34; 35;	47; 50; 51; 56; 57; 59; 60; 61; 62; 63
42 Inadequate separation by pilot	ER31B83	Pilot receives the necessary traffic information for a conflict in controlled airspace but fails to maintain separation		19; 20; 21;	31; 32; 33; 34; 35;	47; 50; 51; 56; 57; 59; 60; 61; 62; 63
43 Separation recovery essential	ER31C4	Given a separation infringement occurs, recovery action is needed to avoid an imminent collision		19; 20; 21;	31; 32; 33; 34; 35;	47; 50; 51; 56; 57; 59; 60; 61; 62; 63
II ATC fails to detect and resolve the conflict						
44 No STCA coverage	ER31B31	ATCO responsible for the aircraft does not have short-term conflict alert (STCA) installed, or it does not cover the location of the conflict	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
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; 39;	47; 48; 50; 51; 52; 53; 54; 55; 56; 57; 58; 59; 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; 39;	47; 48; 50; 51; 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
47 ATCO fails to recover separation in time	ER31B34	ATCO responds to an STCA warning but fails to make effective resolving action in time	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
48 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; 39;	47; 48; 50; 51; 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
49 Other ATCOs fail to detect conflict	ER31B42	Other ATCOs monitoring the aircraft's trajectory fails to recognise the conflict	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
50 ATCOs fail to communicate warning	ER31B43	Other ATCOs recognise the conflict but fails to communicate with the ATCO concerned	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
51 ATCO fails to recover separation in time	ER31B44	ATCO is informed by other ATCO of a conflict but fails to resolve it in time	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
III Flight crew fails to detect and resolve conflict						
52 ACAS not installed	ER31B21	Airborne collision avoidance system (ACAS) is not installed on board the aircraft	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
53 ACAS fails to give RA in time	ER31B22	ACAS fails to give the pilot a resolution advisory (RA) in time to resolve a conflict	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
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	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
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; 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
56 Other aircraft effectively invisible	ER31B111	The other aircraft cannot be seen from the cockpit	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
57 Flight crew fail to observe visible aircraft in time	ER31B112	Pilots fail to observe visible aircraft in time to make avoidance action	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
58 Pilot fails to take avoidance action in time	ER31B113	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	27; 31; 32; 33; 34; 35; 39;	47; 48; 50; 51; 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
59 Visual avoidance invalidated by other aircraft	ER31B114	Pilot's response is cancelled out by opposing manoeuvre from the other aircraft	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
60 Ineffective visual warning on other aircraft	ER31B12	Pilots on the conflicting aircraft fail to resolve the conflict using see & avoid techniques, given similar failure on the subject aircraft	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
61 Collision avoidance essential	ER31C3	Given failure of on board detection and resolution of the conflict, a collision is not avoided through providence	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

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
I Unstable Approach						
1 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 CRM failure		16; 17;	26; 28; 29; 30;	50; 51; 59; 61; 62;
3 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		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 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 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
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
III 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						
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; 40; 41; 42;	47; 48; 50; 51; 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
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	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
V Flight crew fail to maintain control						
18 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	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
19 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
21 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
VI Failure to achieve maximum braking						
22 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
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
24 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
VII Flight crew fail to maintain control						
25 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

28	Insufficient control	AL19B74	The pilot applies correct measures after executing a missed approach but are not enough to prevent aircraft leaving off the side of the runway	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
VIII	Insufficient fuel available for next approach					
29	Flight crew fail to notify ATC of inadequate reserves	AL19B811	Flight crew do not inform the ATC that the fuel reserve is not sufficient for aircraft to perform the next 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
30	Poor flight planning	AL19B8121	Inadequate amount of reserved fuel in aircraft due to poor flight planning	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
31	Aircraft diverted from other location	AL19B8122	Aircraft consumes extra fuel during flight due to a route diversion	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
32	Aircraft executes multiple MA	AL19B82	Aircraft has already performed one or more missed approach previously, and hence the reserved fuel is not sufficient to perform the next 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

Base events		Code	Definition	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
ESD 1	Base events	Code	Definition	Technology	Human	Organisation	System of Organisations
I	Aircraft System Failure						
1	Autoflight Failure	TO01B11	Failure of any of the systems associated with the autopilot and auto throttle	1; 3; 9;	13; 18; 21; 22;	31; 41;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63
2	Communications Failure	TO01B12	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
6	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
II	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
17	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
III	Failure to Achieve Maximum Braking						
18	Insufficient Runway Length	TO01B31	The runway can be 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	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
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
I	Air Traffic related event						
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
3	Pilot failure to follow take-off instructions	TO02B11112	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
4	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 Aircraft caused by other a/c	TO02B11212	Aircraft loses separation with an aircraft landing which is caused by the other aircraft		11; 19; 20; 22; 23;	32; 33; 34; 43; 44	45; 47; 50; 51; 54; 55; 56; 57; 59; 60; 61; 62; 63
6	Separation Infringement with a/c on missed approach	TO02B11213	Aircraft loses separation with an aircraft performing a missed approach		19; 20; 22; 23;	32; 34; 44	47; 50; 51; 54; 55; 56; 57; 59; 60; 61; 62; 63
7	Separation Infringement with departing a/c caused by aircraft taking off	TO02B11214	Aircraft loses separation with an aircraft departing which is caused by the aircraft preparing to take-off		11; 19; 22;	32; 34; 43; 44	45; 50; 51; 54; 55; 56; 57; 59; 60; 61; 62; 63
8	Separation Infringement with landing a/c caused by aircraft taking off	TO02B11215	Aircraft loses separation with an aircraft landing which is caused by the aircraft preparing to take-off		11; 19; 22; 23;	32; 34; 43; 44	45; 47; 50; 51; 54; 55; 56; 57; 59; 60; 61; 62; 63
9	Illegal A/C infringement	TO02B11216	Aircraft deliberately infringes separation disregarding the instruction from ATC		19; 22;	32; 34; 43; 44	45; 47; 50; 51; 59; 60; 61; 62; 63
10	Traffic density too high	TO02B1122	Traffic density above the airport is too high to allow the departing aircraft to take-off		19; 20; 22;	32; 33; 35;	47; 50; 51; 54; 55; 56; 57; 59; 60; 61; 62; 63
11	Aircraft not ready to take-off	TO02B1123	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; 23;	32; 34; 43; 44	45; 50; 51; 56; 57; 59; 60; 61; 62; 63
12	Animals in vicinity of runway	TO02B1124	The presence of animal in the runway area and which may cause a collision hazard		11; 22;	43; 44	45; 49; 50; 51; 59; 60; 61; 62; 63
13	Weather Related Problem	TO02B1125	ATC advise the flight crew that the weather is unsuitable for take-off		22;		48; 50; 51; 56; 57; 59; 60; 61; 62; 63
14	Effective Hazard Avoidance	TO02B12	ATC instructs aircraft to stop during take-off roll		22;		50; 59;
II	Flight Crew rejects take-off						

Base events	Code	Definition	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
15 Pilot Misdiagnosis	TO02B211	The pilot fails to understand the air traffic situation and as a result aborts the take-off above V1		11; 14; 19; 20; 22; 23;	32; 33; 34; 35; 42; 43; 44	45; 47; 48; 49; 50; 51; 54; 55; 56; 57; 59; 60; 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; 51; 54; 55; 56; 57; 59; 60; 61; 62; 63
17 Take-off rejected correctly when below V1	TO02B22	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.		11; 14; 19; 20; 22; 23;	32; 33; 34; 35; 42; 43; 44	45; 47; 48; 49; 50; 51; 54; 55; 56; 57; 59; 60; 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; 51; 54; 55; 56; 57; 59; 60; 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; 51; 54; 55; 56; 57; 59; 60; 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; 51; 54; 55; 56; 57; 59; 60; 61; 62; 63
ESD 3 Base events	Code	Definition	Technology	Human	Organisation	System of Organisations
I Inappropriate handling by flight crew						
1 Unsuccessful handling due to lack of training	TO03B111	Untrained pilot flying (PF) handling take-offs with one engine inoperative on four engine aircraft.	9;	22;		50; 51; 54; 55; 58; 59; 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; 59; 60; 61; 62; 63
3 Adverse Weather Conditions	TO03B12	The prevailing weather conditions affect the directional stability of the aircraft during the take-off roll. The weather conditions that can cause this failure including strong winds and slippery runway conditions.		22;		48; 50; 51; 52; 53; 54; 55; 58; 59; 60; 61; 62; 63
II 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; 54; 55; 58; 59; 60; 61; 62; 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; 54; 55; 58; 59; 60; 61; 62; 63
6 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; 54; 55; 58; 59; 60; 61; 62; 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; 54; 55; 58; 59; 60; 61; 62; 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; 54; 55; 58; 59; 60; 61; 62; 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; 54; 55; 58; 59; 60; 61; 62; 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; 54; 55; 58; 59; 60; 61; 62; 63
IV 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; 54; 55; 58; 59; 60; 61; 62; 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; 54; 55; 58; 59; 60; 61; 62; 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; 54; 55; 58; 59; 60; 61; 62; 63
V 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; 54; 55; 58; 59; 60; 61; 62; 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; 54; 55; 58; 59; 60; 61; 62; 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; 54; 55; 58; 59; 60; 61; 62; 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; 54; 55; 58; 59; 60; 61; 62; 63
ESD 4 Base events	Code	Definition	Technology	Human	Organisation	System of Organisations
I Directional control systems failure						
1 Main Gear Failure	TO04B111	Failure of any part of the main gear	7;			50; 51; 54; 55; 58; 59; 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; 59; 60; 61; 62; 63
3 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 directional instability	7;			50; 51; 54; 55; 58; 59; 60; 61; 62; 63
4 Tyre Failure	TO04B122	Failure of a tyre, i.e. bursting or delamination	7;			50; 51; 54; 55; 58; 59; 60; 61; 62; 63
5 Wheel Sub-Assembly Failure	TO04B123	Failure of any part of the wheel excluding tyre or braking system, i.e. an axle failure or wheel rim failure	7;			50; 51; 54; 55; 58; 59; 60; 61; 62; 63
II Take-off rejection						

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.	7;			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	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 aircraft with speed less than V1	7;			50; 51; 54; 55; 58; 59; 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)						
13 Insufficient Runway Length	TO04B41	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.	7;			50; 51; 54; 55; 58; 59; 60; 61; 62; 63
14 Brakes not functioning correctly	TO04B42	Brakes are not giving maximum braking, e.g. because of improper maintenance and damages	7; 9;			50; 51; 54; 55; 58; 59; 60; 61; 62; 63
15 Brakes not applied correctly	TO04B43	Failure of the flight crew to apply all the braking systems immediately after take-off rejection.	7;		28; 29; 30;	50; 51; 54; 55; 58; 59; 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 aircraft.	7;			50; 51; 54; 55; 58; 59; 60; 61; 62; 63
17 Lack of Control	TO04B52	The pilot makes no attempt to control the aircraft.	7;			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 aircraft leaving off the side of the runway	7;			50; 51; 54; 55; 58; 59; 60; 61; 62; 63
ESD 5 Base events	Code	Definition	Technology	Human	Organisation	System of Organisations
I Incorrect configuration						
1 Unsuccessful TO configuration checklist	TO05B111	Co-pilot fails to determine the position of the flap and slats required for a successful take-off		13; 22;	38; 41;	50; 51; 54; 55; 58; 59; 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 the stand		13; 22;	38; 41;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63
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; 59; 60; 61; 62; 63
5 Verification unsuccessful	TO05B22	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						
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; 59; 60; 61; 62; 63
7 Unsuccessful Maintenance	TO05B312	TOCW system fails due to unsuccessful maintenance and hence the take-off is not rejected	3;	13; 22;	38; 41;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63
8 Unsuccessful Operation	TO05B313	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 circuit breaker following testing		13; 22;	38; 41;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63
9 Unsuccessful Manufacture	TO05B321	TOCW power supply fails due to unsuccessful manufacture and hence the take-off is not rejected	2;	13; 22;	38; 41;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63
10 Unsuccessful Maintenance	TO05B322	TOCW power supply fails due to unsuccessful maintenance and hence the take-off is not rejected	2;	13; 22;	38; 41;	50; 51; 54; 55; 58; 59; 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	TO05B412	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 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 probability.		13; 22;	38; 41;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63
IV Failure to achieve maximum braking						
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	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 immediately after take-off rejection.		13; 22;	28; 29; 30; 38; 41;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63
V Aircraft stalls after rotation						
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; 60; 61; 62; 63
19 Pilot ignores stickshaker	TO05B62	Flight crew take no action to the activated stick-shaker	2; 3;	13; 22;	38; 41;	50; 51; 54; 55; 58; 59; 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; 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; 58; 59; 60; 61; 62; 63
VI Flight crew fails to regain control						
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; 58; 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; 58; 59; 60; 61; 62; 63
24 Incorrect Control	TO05B73	The pilot applies incorrect control to the aircraft. This can be due to improper training, stress and fatigue	2; 3; 6;	13; 22;	38; 41;	48; 50; 51; 54; 55; 58; 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; 58; 59; 60; 61; 62; 63
ESD 9 Base events	Code	Definition	Technology	Human	Organisation	System of Organisations
I Single Engine Failure						
1 Unsuccessful Manufacturing	TO09B11	Manufacture failure of a part of the engine which creates an undetectable defect or a defect that is detectable by the manufacturers testing but not by maintenance testing	9;	13; 18; 22;	31; 38; 41;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63
2 Unsuccessful Maintenance	TO09B12	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	9;	13; 18; 22;	31; 38; 41;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63
3 Unsuccessful Manufacture and Maintenance	TO09B13	Engine is both unsuccessfully manufactured and where maintenance fails to detect the defect that arise from manufacturing	9;	13; 18; 22;	31; 38; 41;	50; 51; 54; 55; 58; 59; 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; 59; 60; 61; 62; 63
II Flight crew rejects take-off						
5 Pilot Misdiagnosis	TO09B211	The pilot either misdiagnoses the situation or misunderstands the effects caused by a single engine failure, and hence incorrectly aborts the take-off.	9;	13; 18; 22;	31; 38; 41;	50; 51; 54; 55; 58; 59; 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; 59; 60; 61; 62; 63
7 Take-off rejected correctly when below V1	TO09B22	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;	13; 18; 22;	31; 38; 41;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63
III 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; 59; 60; 61; 62; 63
9 Lack of control	TO09B32	The pilot makes no attempt to control the aircraft after take-off rejection	9;	13; 18; 22;	31; 38; 41;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63
10 Incorrect Control	TO09B33	The pilot applies incorrect control to the aircraft after take-off rejection. This can be due to improper training, stress and fatigue	9;	13; 18; 22;	31; 38; 41;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63
11 Insufficient control	TO09B34	The pilot applies correct measures after take-off rejection 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; 59; 60; 61; 62; 63
IV Failure to achieve maximum braking						
12 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; 59; 60; 61; 62; 63
13 Brakes not functioning correctly	TO09B42	Brakes are not giving maximum braking, i.e. because of improper maintenance and damages	7; 9;	13; 18; 22;	31; 38; 41;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63
14 Brakes not applied correctly	TO09B43	Failure of the flight crew to apply all the braking systems immediately after take-off rejection.	9;	13; 18; 22;	28; 29; 30; 31; 38; 41;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63
V Flight crew fails to maintain control (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; 59; 60; 61; 62; 63
16 Lack of control	TO09B52	The pilot makes no attempt to control the aircraft after take-off continuation	9;	13; 18; 22;	31; 38; 41;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63
17 Incorrect Control	TO09B53	The pilot applies incorrect control to the aircraft after take-off continuation. This can be due to improper training, stress and fatigue	9;	13; 18; 22;	31; 38; 41;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63
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; 59; 60; 61; 62; 63
ESD 10 Base events	Code	Definition	Technology	Human	Organisation	System of Organisations
I Pitch Control Problem						
1 Trim settings incorrectly determined	TO10B1111	Flight crew fail to complete the trim configuration checklist and fail to verify the checklist		22;		50; 51; 54; 55; 58; 59; 60; 61; 62; 63
2 Speed settings incorrectly determined	TO10B1112	Flight crew fail to complete the speed bug checklist and fail to verify the checklist		22;		50; 51; 54; 55; 58; 59; 60; 61; 62; 63
3 Trim settings incorrectly entered into FMC	TO10B112	Given that the trim settings have been correctly determined, the co-pilot enter the settings incorrectly and these are verified by the captain during the taxi checklist		22;		50; 51; 54; 55; 58; 59; 60; 61; 62; 63
4 Speed settings incorrectly entered into FMC	TO10B113	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; 59; 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 failure of a flight control system	3;	22;		50; 51; 54; 55; 58; 59; 60; 61; 62; 63
7 Unsuccessful Manufacture	TO10B1312	Unsuccessful manufacture of one of the integral components causes the failure of a flight control system	3;	22;		50; 51; 54; 55; 58; 59; 60; 61; 62; 63
8 Unsuccessful Maintenance	TO10B1313	Maintenance of the flight control system is not conducted or not successfully completed such that one of the flight control system fails	3;	22;		50; 51; 54; 55; 58; 59; 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; 58; 59; 60; 61; 62; 63

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 severe enough to cause a pitch control problem	3;	22;		50; 51; 54; 55; 58; 59; 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 is causing the pitch control problems or wrongly attributes them to something else.	3; 7;	22;		49; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
12 Crew Misjudge Situation	TO10B212	The flight crew diagnoses the situation, realising what is causing the pitch control problems but misjudges the situation and incorrectly aborts the take-off when the aircraft is above V1	3; 7;	22;		49; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
13 Take-off rejected correctly when below V1	TO10B22	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.	3; 7;	22;		49; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
III Failure to achieve maximum braking						
14 Insufficient Runway Length	TO10B31	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.	3; 7;	22;		49; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
15 Brakes not functioning correctly	TO10B32	Brakes are not giving maximum braking, i.e. because of improper maintenance and damages	3; 7;	22;		49; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
16 Brakes not applied correctly	TO10B33	Failure of the flight crew to apply all the braking systems immediately after take-off rejection.	3; 7;	22;	28; 29; 30;	49; 50; 51; 54; 55; 58; 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 and hence fails to rectify the problem.	3; 7;	22;		49; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
18 Unsuccessful Pitch Control Rectification	TO10B42	Flight crew diagnoses the causes of the pitch control problem but fails to rectify it	3; 7;	22;		49; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63

ESD 35	Code	Identifiable precursors	No.	SPIs: System of Organisations			
				SPIs: Technology	SPIs: Human	SPIs: Organisation	
		Identifiable precursors	No.	Technology	Human	Organisation	System of Organisations
		Flight crew decision error /operation of equipment error					
1	AL35F5211	Ground Navigational Aid failure	62		15; 16; 17; 23; 25	26; 27; 33; 35; 36; 37; 38; 39;	50; 51; 56; 57; 59; 60; 61; 62; 63
		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				
		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149				
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150				
		Not recognized ground Nav aids System failure not reflected in NOTAM messages	308				
		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 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 components (e.g. ILS)	490				
2	AL35F5212	System failure affecting the operation of primary instruments / displays or standby instruments	26	3;	15; 16; 17; 21; 23; 25	26; 27; 33; 35; 36; 37; 38; 39;	50; 51; 56; 57; 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				
		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 the SOP in terms of critical indicators cross-checking	224				
		Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. Navigational aid failure.	303				
		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491				
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492				
		Flaws in manufacturer quality control process - Onboard navigational systems and components.	493				
3	AL35F5213	Inadequate navigational chart	69		15; 16; 17; 18; 21; 23; 25	26; 27; 31; 33; 35; 36; 37; 38; 39;	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				
		Lack of adherence to SOP in terms of approach and landing	245				
4	AL35F5214	Flaws in aircraft system maintenance process definition - stickshaker	136		15; 16; 17; 23;	26; 35; 36; 37; 38; 39;	50; 51; 56; 57; 59; 60; 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 clearance instruction	307				
5	AL35F522	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151		15; 16; 17; 18; 20; 21; 23;	26; 27; 32; 33; 34; 35; 36; 37; 38; 39;	50; 51; 56; 57; 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 SOP in terms of approach and landing	245				
6	AL35F523	Adverse weather / poor visibility conditions / darkness	6		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 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 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				
		Altimeter setting error	274				
7	AL35F524	Pilot tiredness - Inadequate workload distribution	167		15; 16; 17; 18; 20; 23; 25	26; 27; 36; 37; 38; 39;	50; 51; 56; 57; 59; 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				
8	AL35F53	Adverse weather / poor visibility conditions / darkness	6		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				
		MSAW warning	51				
9	AL35F6211	Ground Navigational Aid failure	62	3;	15; 16; 17; 18; 20; 21; 23; 25	26; 27; 31; 33; 35; 36; 37; 38; 39;	50; 51; 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
		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				
		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations	
	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	167					
	Flaws in pilot requirements definition process and/or training methodology	168					
	Failure to check navigation accuracy before approach	275					
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299					
	Not recognized ground Nav aids System failure not reflected in NOTAM messages	308					
	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 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 components (e.g. ILS)	490					
10	AL35F6212	System failure affecting the operation of primary instruments / displays or standby instruments	26	3;	15; 16; 17; 18; 20; 21; 23; 25	26; 27; 31; 33; 35; 36; 37; 38; 39;	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					
	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 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 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299					
	Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. Navigational aid failure.	303					
	Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491					
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492					
	Flaws in manufacturer quality control process - Onboard navigational systems and components.	493					
11	AL35F6213	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149		15; 16; 17; 20; 23;	26; 37; 38; 39;	50; 51; 59; 60; 61; 62; 63
	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 - Ground navigational systems and components (e.g. ILS)	489					
12	AL35F6214	Error in preparation of database for FMS	61	3;	15; 16; 17; 18; 21; 24; 25	26; 27; 31; 33; 37; 38; 39;	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					
13	AL35F622	System failure affecting the operation of primary instruments / displays or standby instruments	26	3;	15; 16; 17; 18; 21; 24; 25	26; 27; 31; 33; 37; 38; 39;	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					
	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					
	Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)	410					
14	AL35F623	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151		15; 16; 17; 18; 21; 24; 25	26; 27; 31; 33; 37; 38; 39;	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					
	Incorrect use of automation - FMS	269					
	Unintuitive and / or error prone system manual - FMS	494					
15	AL35F624	Pilot tiredness - Inadequate workload distribution	167		15; 16; 17; 18; 21; 24; 25	26; 27; 31; 33; 37; 38; 39;	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 in terms of approach and landing	245					
	Incorrect use of automation - FMS	269					
16	AL35F63	Adverse weather / poor visibility conditions / darkness	6		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					
	MSAW warning	51					
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

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	Flaws in traffic controller requirements definition process and/or training methodology	145				
	Current airport diagram not reflecting critical changes	155				
18	AL35F722	Prolonged loss of communications (PLOC) between pilot and controller(s)	53		15; 16; 17; 20; 23;	26; 36; 37; 38; 39;
	Lack of English proficiency	132				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				
	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				
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168				
19	AL35F723	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151		15; 16; 17; 18; 20; 21; 23;	26; 36; 37; 38; 39;
	Pilot tiredness - Inadequate workload distribution	167				50; 51; 59; 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				
20	AL35F73	Adverse weather / poor visibility conditions / darkness	6		15; 16; 17; 20; 23;	26; 36; 37; 38; 39;
	GPWS / TAWS alert / warning (genuine or spurious)	50				48; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
	MSAW warning	51				
II		Flight crew CRM failure				
21	AL35B4111	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151	3;	15; 16; 17; 18; 20; 21; 23; 24; 25	26; 27; 31; 32; 33; 34; 35; 36; 37; 38; 39;
	Pilot tiredness - Inadequate workload distribution	167				48; 50; 51; 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
	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	6				
	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				
	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 protecting of critical aircraft systems against contamination	233				
	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				
	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				
	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).	225				
	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 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299				
	Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. Navigational aid failure.	303				
	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 clearance instruction	307				
	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.)	410				
	Flaws in aircraft system maintenance process definition - Ground navigational systems and components (e.g. ILS)	488				

Code	Identifiable precursors	No.	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 - Ground navigational systems and components (e.g. ILS)	489				
	Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS)	490				
	Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492				
	Flaws in manufacturer quality control process - Onboard navigational systems and components.	493				
	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 or / and passive contribution to the PF duties	151	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				
	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 instruments	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	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 protecting of critical aircraft systems against contamination	233				
	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				
	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				
	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).	225				
	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 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299				
	Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. Navigational aid failure.	303				
	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 clearance instruction	307				
	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.)	410				
	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 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 components (e.g. ILS)	490				
	Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492				
	Flaws in manufacturer quality control process - Onboard navigational systems and components.	493				
	Unintuitive and / or error prone system manual - FMS	494				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations	
23	AL35B4113	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151	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 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 instruments	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	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 protecting of critical aircraft systems against contamination	233				
		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				
		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				
		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).	225				
		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 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299				
		Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. Navigational aid failure.	303				
		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 clearance instruction	307				
		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.)	410				
		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 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 components (e.g. ILS)	490				
		Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491				
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492				
		Flaws in manufacturer quality control process - Onboard navigational systems and components.	493				
		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 or / and passive contribution to the PF duties	151	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 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 instruments	26				
		GPWS / TAWS alert / warning (genuine or spurious)	50				
		MSAW warning	51				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of 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				
	Inadequate navigational chart	69				
	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	233				
	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				
	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				
	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).	225				
	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 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299				
	Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. Navigational aid failure.	303				
	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 clearance instruction	307				
	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.)	410				
	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 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 components (e.g. ILS)	490				
	Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492				
	Flaws in manufacturer quality control process - Onboard navigational systems and components.	493				
	Unintuitive and / or error prone system manual - FMS	494				
25 AL35B4122	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151	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 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 instruments	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	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 protecting of critical aircraft systems against contamination	233				
	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				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	148				
	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				
	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).	225				
	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 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299				
	Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. Navigational aid failure.	303				
	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 clearance instruction	307				
	Not recognized ground Nav aids System failure not reflected in NOTAM messages	308				
	Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)	410				
	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 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 components (e.g. ILS)	490				
	Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492				
	Flaws in manufacturer quality control process - Onboard navigational systems and components.	493				
	Unintuitive and / or error prone system manual - FMS	494				
26 AL35B4123	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151	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 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 instruments	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	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 protecting of critical aircraft systems against contamination	233				
	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				
	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				
	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				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of 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 locations (e.g. mountains).	225					
	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 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299					
	Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. Navigational aid failure.	303					
	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 clearance instruction	307					
	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.)	410					
	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 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 components (e.g. ILS)	490					
	Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491					
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492					
	Flaws in manufacturer quality control process - Onboard navigational systems and components.	493					
	Unintuitive and / or error prone system manual - FMS	494					
27	AL35B4124	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151	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 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 instruments	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	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 protecting of critical aircraft systems against contamination	233				
		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				
		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				
		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).	225				
		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 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299				
		Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. Navigational aid failure.	303				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	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 clearance instruction	307				
	Not recognized ground Nav aids System failure not reflected in NOTAM messages	308				
	Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)	410				
	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 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 components (e.g. ILS)	490				
	Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492				
	Flaws in manufacturer quality control process - Onboard navigational systems and components.	493				
	Unintuitive and / or error prone system manual - FMS	494				
28 AL35B42	Pilot tiredness - Inadequate workload distribution	167	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 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 instruments	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	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 protecting of critical aircraft systems against contamination	233				
	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				
	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				
	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).	225				
	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 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299				
	Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. Navigational aid failure.	303				
	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 clearance instruction	307				
	Not recognized ground Nav aids System failure not reflected in NOTAM messages	308				
	Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)	410				
	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 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 components (e.g. ILS)	490				
	Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491				

Code	Identifiable precursors	No.	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 - Onboard navigational systems and components.	492				
	Flaws in manufacturer quality control process - Onboard navigational systems and components.	493				
	Unintuitive and / or error prone system manual - FMS	494				
29	AL35B431 Pilot tiredness - Inadequate workload distribution	167	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 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 inappropriate relation between cpt and his subordinates	304				
	Adverse weather / poor visibility conditions / darkness	6				
	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				
	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 protecting of critical aircraft systems against contamination	233				
	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				
	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				
	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).	225				
	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 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299				
	Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. Navigational aid failure.	303				
	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 clearance instruction	307				
	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.)	410				
	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 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 components (e.g. ILS)	490				
	Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492				
	Flaws in manufacturer quality control process - Onboard navigational systems and components.	493				
	Unintuitive and / or error prone system manual - FMS	494				
30	AL35B432 Pilot tiredness - Inadequate workload distribution	167	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 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				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	Adverse weather / poor visibility conditions / darkness	6				
	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				
	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 protecting of critical aircraft systems against contamination	233				
	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				
	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				
	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).	225				
	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 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299				
	Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. Navigational aid failure.	303				
	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 clearance instruction	307				
	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.)	410				
	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 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 components (e.g. ILS)	490				
	Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492				
	Flaws in manufacturer quality control process - Onboard navigational systems and components.	493				
	Unintuitive and / or error prone system manual - FMS	494				
31 AL35B441	Pilot tiredness - Inadequate workload distribution	167	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 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 inappropriate relation between cpt and his subordinates	304				
	Adverse weather / poor visibility conditions / darkness	6				
	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				
	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 protecting of critical aircraft systems against contamination	233				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of 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 driver	148				
	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				
	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).	225				
	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 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299				
	Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. Navigational aid failure.	303				
	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 clearance instruction	307				
	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.)	410				
	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 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 components (e.g. ILS)	490				
	Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492				
	Flaws in manufacturer quality control process - Onboard navigational systems and components.	493				
	Unintuitive and / or error prone system manual - FMS	494				
32 AL35B442	Pilot tiredness - Inadequate workload distribution	167	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 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 instruments	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	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 protecting of critical aircraft systems against contamination	233				
	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				
	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				
	Current airport diagram not reflecting critical changes	155				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of 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				
	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				
	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 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299				
	Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. Navigational aid failure.	303				
	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 clearance instruction	307				
	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.)	410				
	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 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 components (e.g. ILS)	490				
	Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492				
	Flaws in manufacturer quality control process - Onboard navigational systems and components.	493				
	Unintuitive and / or error prone system manual - FMS	494				
III	Flight crew loss of situation awareness					
33 AL35C2	GPWS / TAWS alert / warning (genuine or spurious)	50	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
	Adverse weather / poor visibility conditions / darkness	6				
	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				
	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 protecting of critical aircraft systems against contamination	233				
	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				
	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				
	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).	225				
	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 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299				
	Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. Navigational aid failure.	303				
	Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)	306				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	Lack of adherence to SOP for AIR operations in terms of controller error in approach clearance instruction	307				
	Not recognized ground Nav aids System failure not reflected in NOTAM messages	308				
	Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)	410				
	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 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 components (e.g. ILS)	490				
	Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492				
	Flaws in manufacturer quality control process - Onboard navigational systems and components.	493				
	Unintuitive and / or error prone system manual - FMS	494				
	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 approach and landing	245				
	Flaws in CRM training procedures	263				
	Lack of adherence to the main CRM rules	264				
	Imbalanced and inappropriate relation between cpt and his subordinates	304				
34 AL35B2111	Adverse weather / poor visibility conditions / darkness	6	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
	Adverse weather / poor visibility conditions / darkness	6				
	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				
	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 protecting of critical aircraft systems against contamination	233				
	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				
	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				
	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).	225				
	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 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299				
	Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. Navigational aid failure.	303				
	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 clearance instruction	307				
	Not recognized ground Nav aids System failure not reflected in NOTAM messages	308				
	Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)	410				
	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 of the system / product compliance with requirements - Ground navigational systems and components (e.g. ILS)	489				

Code	Identifiable precursors	No. SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	Flaws in manufacturer quality control process - Ground navigational systems and components (e.g. ILS)	490			
	Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491			
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492			
	Flaws in manufacturer quality control process - Onboard navigational systems and components.	493			
	Unintuitive and / or error prone system manual - FMS	494			
	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 approach and landing	245			
	Flaws in CRM training procedures	263			
	Lack of adherence to the main CRM rules	264			
	Imbalanced and inappropriate relation between cpt and his subordinates	304			
35	AL35B2112	6	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
	Adverse weather / poor visibility conditions / darkness	6			
	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			
	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 protecting of critical aircraft systems against contamination	233			
	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			
	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			
	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).	225			
	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 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299			
	Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. Navigational aid failure.	303			
	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 clearance instruction	307			
	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.)	410			
	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 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 components (e.g. ILS)	490			
	Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491			
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492			
	Flaws in manufacturer quality control process - Onboard navigational systems and components.	493			
	Unintuitive and / or error prone system manual - FMS	494			

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 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 approach and landing	245				
	Flaws in CRM training procedures	263				
	Lack of adherence to the main CRM rules	264				
	Imbalanced and inappropriate relation between cpt and his subordinates	304				
36	AL35B212	151	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
	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 approach and landing	245				
	Adverse weather / poor visibility conditions / darkness	6				
	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				
	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 protecting of critical aircraft systems against contamination	233				
	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				
	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				
	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).	225				
	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 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299				
	Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. Navigational aid failure.	303				
	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 clearance instruction	307				
	Not recognized ground Navais System failure not reflected in NOTAM messages	308				
	Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)	410				
	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 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 components (e.g. ILS)	490				
	Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492				
	Flaws in manufacturer quality control process - Onboard navigational systems and components.	493				
	Unintuitive and / or error prone system manual - FMS	494				
	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 approach and landing	245				
	Flaws in CRM training procedures	263				
	Lack of adherence to the main CRM rules	264				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations	
37	AL35B213	Imbalanced and inappropriate relation between cpt and his subordinates	304				
	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 RWY parameters and location, approach path parameters and obstacles locations.	295					
	Adverse weather / poor visibility conditions / darkness	6					
	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					
	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 protecting of critical aircraft systems against contamination	233					
	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					
	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					
	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).	225					
	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 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299					
	Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. Navigational aid failure.	303					
	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 clearance instruction	307					
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.)	410						
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 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 components (e.g. ILS)	490						
Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491						
Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492						
Flaws in manufacturer quality control process - Onboard navigational systems and components.	493						
Unintuitive and / or error prone system manual - FMS	494						
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 approach and landing	245						
Flaws in CRM training procedures	263						
Lack of adherence to the main CRM rules	264						
Imbalanced and inappropriate relation between cpt and his subordinates	304						
38	AL35C3	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					

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	Lack of adherence to SOP in terms of approach and landing	245				
	Premature descent to DA(H) before G/S intercept or premature descent to MDA(H) before final-descent-point / FAF	281				
	Adverse weather / poor visibility conditions / darkness	6				
	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				
	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 protecting of critical aircraft systems against contamination	233				
	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				
	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				
	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).	225				
	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 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299				
	Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. Navigational aid failure.	303				
	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 clearance instruction	307				
	Not recognized ground Navais System failure not reflected in NOTAM messages	308				
	Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)	410				
	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 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 components (e.g. ILS)	490				
	Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492				
	Flaws in manufacturer quality control process - Onboard navigational systems and components.	493				
	Unintuitive and / or error prone system manual - FMS	494				
	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 approach and landing	245				
	Flaws in CRM training procedures	263				
	Lack of adherence to the main CRM rules	264				
	Imbalanced and inappropriate relation between cpt and his subordinates	304				
39 AL35B22A	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				
	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				
	Failure to go-around, when so required	289				
	Failure to follow published missed-approach procedure	291				
	Adverse weather / poor visibility conditions / darkness	6				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	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				
	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 protecting of critical aircraft systems against contamination	233				
	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				
	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				
	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).	225				
	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 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299				
	Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. Navigational aid failure.	303				
	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 clearance instruction	307				
	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.)	410				
	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 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 components (e.g. ILS)	490				
	Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492				
	Flaws in manufacturer quality control process - Onboard navigational systems and components.	493				
	Unintuitive and / or error prone system manual - FMS	494				
	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 approach and landing	245				
	Flaws in CRM training procedures	263				
	Lack of adherence to the main CRM rules	264				
	Imbalanced and inappropriate relation between cpt and his subordinates	304				
40 AL35B31	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
	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 terrain)	278				
	Continued approach, when below DA(H) or MDA(H), after loss of visual references	284				
	Adverse weather / poor visibility conditions / darkness	6				
	System failure affecting the operation of primary instruments / displays or standby instruments	26				
	GPWS / TAWS alert / warning (genuine or spurious)	50				
	MSAW warning	51				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of 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				
	Inadequate navigational chart	69				
	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	233				
	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				
	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				
	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).	225				
	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 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299				
	Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. Navigational aid failure.	303				
	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 clearance instruction	307				
	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.)	410				
	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 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 components (e.g. ILS)	490				
	Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492				
	Flaws in manufacturer quality control process - Onboard navigational systems and components.	493				
	Unintuitive and / or error prone system manual - FMS	494				
	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 approach and landing	245				
	Flaws in CRM training procedures	263				
	Lack of adherence to the main CRM rules	264				
	Imbalanced and inappropriate relation between cpt and his subordinates	304				
41 AL35B321	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;
	Flaws in traffic controller requirements definition process and/or training methodology	145				61; 62; 63
	Adverse weather / poor visibility conditions / darkness	6				
	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				
	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 protecting of critical aircraft systems against contamination	233				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of 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 driver	148					
	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					
	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).	225					
	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 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299					
	Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. Navigational aid failure.	303					
	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 clearance instruction	307					
	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.)	410					
	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 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 components (e.g. ILS)	490					
	Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491					
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492					
	Flaws in manufacturer quality control process - Onboard navigational systems and components.	493					
	Unintuitive and / or error prone system manual - FMS	494					
	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 approach and landing	245					
	Flaws in CRM training procedures	263					
	Lack of adherence to the main CRM rules	264					
	Imbalanced and inappropriate relation between cpt and his subordinates	304					
42	AL35B3221	Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of MSAW system.	302	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
	Adverse weather / poor visibility conditions / darkness	6					
	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					
	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 protecting of critical aircraft systems against contamination	233					
	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					
	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149					

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	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				
	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).	225				
	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 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299				
	Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. Navigational aid failure.	303				
	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 clearance instruction	307				
	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.)	410				
	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 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 components (e.g. ILS)	490				
	Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492				
	Flaws in manufacturer quality control process - Onboard navigational systems and components.	493				
	Unintuitive and / or error prone system manual - FMS	494				
	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 approach and landing	245				
	Flaws in CRM training procedures	263				
	Lack of adherence to the main CRM rules	264				
	Imbalanced and inappropriate relation between cpt and his subordinates	304				
43	AL35B3222	411	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
	Adverse weather / poor visibility conditions / darkness	6				
	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				
	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 protecting of critical aircraft systems against contamination	233				
	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				
	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				
	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				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of 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 locations (e.g. mountains).	225					
	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 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299					
	Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. Navigational aid failure.	303					
	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 clearance instruction	307					
	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.)	410					
	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 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 components (e.g. ILS)	490					
	Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491					
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492					
	Flaws in manufacturer quality control process - Onboard navigational systems and components.	493					
	Unintuitive and / or error prone system manual - FMS	494					
	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 approach and landing	245					
	Flaws in CRM training procedures	263					
	Lack of adherence to the main CRM rules	264					
	Imbalanced and inappropriate relation between cpt and his subordinates	304					
44	AL35B3223	MSAW warning	51	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
		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 immediate answer on supporting systems warning. MSAW warning.	495				
		Adverse weather / poor visibility conditions / darkness	6				
		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				
		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 protecting of critical aircraft systems against contamination	233				
		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				
		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				
		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).	225				
		Lack of adherence to SOP in terms of approach and landing	245				
		Incorrect use of automation - FMS	269				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	Altimeter setting error	274				
	Failure to check navigation accuracy before approach	275				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299				
	Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. Navigational aid failure.	303				
	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 clearance instruction	307				
	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.)	410				
	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 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 components (e.g. ILS)	490				
	Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492				
	Flaws in manufacturer quality control process - Onboard navigational systems and components.	493				
	Unintuitive and / or error prone system manual - FMS	494				
	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 approach and landing	245				
	Flaws in CRM training procedures	263				
	Lack of adherence to the main CRM rules	264				
	Imbalanced and inappropriate relation between cpt and his subordinates	304				
45 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 instruments	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	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 protecting of critical aircraft systems against contamination	233				
	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				
	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				
	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).	225				
	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 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations	
	Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. Navigational aid failure.	303					
	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 clearance instruction	307					
	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.)	410					
	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 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 components (e.g. ILS)	490					
	Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491					
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492					
	Flaws in manufacturer quality control process - Onboard navigational systems and components.	493					
	Unintuitive and / or error prone system manual - FMS	494					
	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 approach and landing	245					
	Flaws in CRM training procedures	263					
	Lack of adherence to the main CRM rules	264					
	Imbalanced and inappropriate relation between cpt and his subordinates	304					
IV	GPWS failure						
46	AL35B11	Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS	293	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
		Adverse weather / poor visibility conditions / darkness	6				
		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				
		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 protecting of critical aircraft systems against contamination	233				
		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				
		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				
		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).	225				
		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 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299				
		Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. Navigational aid failure.	303				
		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 clearance instruction	307				
		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.)	410				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations	
	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 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 components (e.g. ILS)	490					
	Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491					
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492					
	Flaws in manufacturer quality control process - Onboard navigational systems and components.	493					
	Unintuitive and / or error prone system manual - FMS	494					
	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 approach and landing	245					
	Flaws in CRM training procedures	263					
	Lack of adherence to the main CRM rules	264					
	Imbalanced and inappropriate relation between cpt and his subordinates	304					
	Adverse weather / poor visibility conditions / darkness	6					
	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	145					
	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 approach and landing	245					
	Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain)	278					
	Premature descent to DA(H) before G/S intercept or premature descent to MDA(H) before final-descent-point / FAF	281					
	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.	295					
	Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of MSAW system.	302					
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MSAW System	411					
	Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. MSAW warning.	495					
47	AL35B12	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149	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
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150				
		Flaws in aircraft system maintenance process definition - GPWS system components	485				
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - GPWS system components	486				
		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 instruments	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	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 protecting of critical aircraft systems against contamination	233				
		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				
		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149				

Code	Identifiable precursors	No. SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	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			
	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).	225			
	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 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299			
	Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. Navigational aid failure.	303			
	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 clearance instruction	307			
	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.)	410			
	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 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 components (e.g. ILS)	490			
	Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491			
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492			
	Flaws in manufacturer quality control process - Onboard navigational systems and components.	493			
	Unintuitive and / or error prone system manual - FMS	494			
	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 approach and landing	245			
	Flaws in CRM training procedures	263			
	Lack of adherence to the main CRM rules	264			
	Imbalanced and inappropriate relation between cpt and his subordinates	304			
	Adverse weather / poor visibility conditions / darkness	6			
	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	145			
	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 approach and landing	245			
	Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain)	278			
	Premature descent to DA(H) before G/S intercept or premature descent to MDA(H) before final-descent-point / FAF	281			
	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.	295			
	Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of MSAW system.	302			
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MSAW System	411			
	Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. MSAW warning.	495			

ESD 32	Code	Identifiable precursors	No. SPIs:			SPIs: System of Organisations		
			Technology	Human	Organisation			
1	TO32B611	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					
		Inefficient / confusing TWR traffic control procedures, inefficient management of hot spots	139					
		Flaws in traffic 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					
		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 / clearance	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 driver	148							
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	145					
		Lack of or poor communication quality	146					
		Hearback omitted	169					
4	TO32B421	Taxiway confusion	7	11; 19; 22;	43; 44	45; 50; 51; 52; 53; 59; 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							
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 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 process and/or training methodology	130							
6	TO32B41121			Runway confusion	1	11; 19; 22;	43; 44	45; 50; 51; 52; 53; 56; 57; 59; 60; 61; 62; 63
		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 situation on the airtaxi or / and aircraft / vehicle proximity	144					
		Flaws in traffic 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					
		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 / clearance	143							

Code	Identifiable precursors	No.	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; 52; 53; 56; 57; 59; 60; 61; 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 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				
9	TO32B411112 Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149		11; 12; 19; 22;	43; 44	45; 46; 48; 50; 51; 52; 53; 56; 57; 59; 60; 61; 62; 63
	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 - Ground Radar	165				
10	TO32B411113 Traffic controller tiredness - Inadequate workload distribution	137		11; 12; 19; 22;	43; 44	45; 46; 48; 50; 51; 52; 53; 56; 57; 59; 60; 61; 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; 52; 53; 56; 57; 59; 60; 61; 62; 63
	Lack of adherence to SOP for GND movements. Lack of awareness of own position on the airtaxi and airport topology.	142				
	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				
12	TO32B4111212 Adverse weather / poor visibility conditions / darkness	6		11; 12; 19; 22;	43; 44	45; 46; 48; 50; 51; 52; 53; 56; 57; 59; 60; 61; 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 situation on the airtaxi or / and aircraft / vehicle proximity	144				
	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; 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	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 ATCO and approach or ground controller communication	163				
14	TO32B51 Adverse weather / poor visibility conditions / darkness	6		11; 19; 22;	43; 44	45; 48; 50; 51; 52; 53; 59; 60; 61; 62; 63
	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 the airtaxi and airport topology.	142				
	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				
15	TO32B52 Adverse weather / poor visibility conditions / darkness	6		11; 19; 22;	43; 44	45; 48; 50; 51; 52; 53; 59; 60; 61; 62; 63
	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 the airtaxi and airport topology.	142				
	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				
16	TO32B53 Emergency landing	8		11; 19;	43; 44	45; 50; 51; 56; 57; 59; 60; 62; 63
	Takeoff without clearance	157				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	Landing without clearance	158				
	Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	160				
17	TO32B54					
	Adverse weather / poor visibility conditions / darkness	6		11; 19; 22;	43; 44	45; 48; 50; 51; 52; 53; 56; 57; 59; 60; 61; 62; 63
	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 the airtide and airport topology.	142				
	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				
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 separation on the RWY.	123				
	Lack of or poor communication quality	146				
	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				
	0					
19	TO32B21					
	Traffic controller tiredness - Inadequate workload distribution	137		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 SOP in terms of awareness on supporting systems (warning) - RIMCAS.	156				
	Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of Runway Conflict Warning System.	172				
	Runway confusion	1				
	Adverse weather / poor visibility conditions / darkness	6				
	Taxiway confusion	7				
	Emergency landing	8				
	Lack of adherence to SOP for take-off procedure in terms of maintaining adequate 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 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 the airtide and airport topology.	142				
	Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	143				
	Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airtide 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 driver	148				
	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				
	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 landings	160				
	Lack of adherence to SOP in terms of ATCO and approach or ground controller communication	163				
	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 omitted	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				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	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				
20	TO32B22	149		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 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 - RCWS	205				
	Runway confusion	1				
	Adverse weather / poor visibility conditions / darkness	6				
	Taxiway confusion	7				
	Emergency landing	8				
	Lack of adherence to SOP for take-off procedure in terms of maintaining adequate 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 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 the airsite and airport topology.	142				
	Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	143				
	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 driver	148				
	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				
	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 landings	160				
	Lack of adherence to SOP in terms of ATCO and approach or ground controller communication	163				
	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 omitted	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 distribution	129				
	Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130				
21	TO32B23	156		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
	Lack of adherence to SOP in terms of awareness on supporting systems (warning) - RIMCAS.	156				
	Traffic controller tiredness - Inadequate workload distribution	137				
	Flaws in traffic controller requirements definition process and/or training methodology	145				
	Runway confusion	1				
	Adverse weather / poor visibility conditions / darkness	6				
	Taxiway confusion	7				
	Emergency landing	8				
	Lack of adherence to SOP for take-off procedure in terms of maintaining adequate 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 spots	139				
	Lack of adherence to SOP for GND movements.	141				

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 of own position on the airsite and airport topology.	142				
	Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	143				
	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 driver	148				
	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				
	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 landings	160				
	Lack of adherence to SOP in terms of ATCO and approach or ground controller communication	163				
	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 omitted	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 distribution	129				
	Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130				
22	TO32B24	Traffic controller tiredness - Inadequate workload distribution	137	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	1			
		Adverse weather / poor visibility conditions / darkness	6			
		Taxiway confusion	7			
		Emergency landing	8			
		Lack of adherence to SOP for take-off procedure in terms of maintaining adequate 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 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 the airsite and airport topology.	142			
		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	143			
		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 driver	148			
		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			
		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 landings	160			
		Lack of adherence to SOP in terms of ATCO and approach or ground controller communication	163			
		Unintuitive and / or error prone system manual - ground radar.	164			

Code	Identifiable precursors	No.	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 - Ground Radar	165				
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168				
	Hearback omitted	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 distribution	129				
	Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130				
23	TO32B111					
	Adverse weather / poor visibility conditions / darkness	6		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	1				
	Adverse weather / poor visibility conditions / darkness	6				
	Taxiway confusion	7				
	Emergency landing	8				
	Lack of adherence to SOP for take-off procedure in terms of maintaining adequate 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 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 the airtaxi and airport topology.	142				
	Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	143				
	Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airtaxi 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 driver	148				
	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				
	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 landings	160				
	Lack of adherence to SOP in terms of ATCO and approach or ground controller communication	163				
	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 omitted	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 distribution	129				
	Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130				
24	TO32B112					
	Adverse weather / poor visibility conditions / darkness	6		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
	Lack of adherence to ICAO Annex 14 and related documents in terms of airtaxi lights distribution	147				
	Runway confusion	1				
	Adverse weather / poor visibility conditions / darkness	6				
	Taxiway confusion	7				
	Emergency landing	8				
	Lack of adherence to SOP for take-off procedure in terms of maintaining adequate 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				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	Inefficient / confusing TWR traffic control procedures, inefficient management of hot 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 the airtaxi and airport topology.	142				
	Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	143				
	Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airtaxi 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 driver	148				
	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				
	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 landings	160				
	Lack of adherence to SOP in terms of ATCO and approach or ground controller communication	163				
	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 omitted	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 distribution	129				
	Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130				
25 TO32B113	Lack of adherence to ICAO Annex 14 and related documents in terms of nonrestricted view on airtaxi from TWR	166		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	1				
	Adverse weather / poor visibility conditions / darkness	6				
	Taxiway confusion	7				
	Emergency landing	8				
	Lack of adherence to SOP for take-off procedure in terms of maintaining adequate 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 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 the airtaxi and airport topology.	142				
	Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	143				
	Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airtaxi 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 driver	148				
	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				
	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 landings	160				
	Lack of adherence to SOP in terms of ATCO and approach or ground controller communication	163				
	Unintuitive and / or error prone system manual - ground radar.	164				

Code	Identifiable precursors	No. 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 - Ground Radar	165			
	Pilot tiredness - Inadequate workload distribution	167			
	Flaws in pilot requirements definition process and/or training methodology	168			
	Hearback omitted	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 distribution	129			
	Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130			
26 TO32B114	Adverse weather / poor visibility conditions / darkness	6	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
	Traffic controller tiredness - Inadequate workload distribution	137			
	Flaws in traffic controller requirements definition process and/or training methodology	145			
	Runway confusion	1			
	Adverse weather / poor visibility conditions / darkness	6			
	Taxiway confusion	7			
	Emergency landing	8			
	Lack of adherence to SOP for take-off procedure in terms of maintaining adequate 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 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 the airsite and airport topology.	142			
	Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	143			
	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 driver	148			
	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			
	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 landings	160			
	Lack of adherence to SOP in terms of ATCO and approach or ground controller communication	163			
	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 omitted	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 distribution	129			
	Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130			
27 TO32B115	Incorrect 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	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			
	Runway confusion	1			
	Adverse weather / poor visibility conditions / darkness	6			
	Taxiway confusion	7			

Code	Identifiable precursors	No. SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	Emergency landing	8			
	Lack of adherence to SOP for take-off procedure in terms of maintaining adequate 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 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 the airsite and airport topology.	142			
	Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	143			
	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 driver	148			
	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			
	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 landings	160			
	Lack of adherence to SOP in terms of ATCO and approach or ground controller communication	163			
	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 omitted	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 distribution	129			
	Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130			
28 TO32B3	not identifiable at the moment		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	1			
	Adverse weather / poor visibility conditions / darkness	6			
	Taxiway confusion	7			
	Emergency landing	8			
	Lack of adherence to SOP for take-off procedure in terms of maintaining adequate 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 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 the airsite and airport topology.	142			
	Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	143			
	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 driver	148			
	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			
	Callsign confusion	154			

Code	Identifiable precursors	No. SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	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 landings	160			
	Lack of adherence to SOP in terms of ATCO and approach or ground controller communication	163			
	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 omitted	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 distribution	129			
	Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130			
III + II + I	0				
29 TO32C3	not identifiable at the moment		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	1			
	Adverse weather / poor visibility conditions / darkness	6			
	Taxiway confusion	7			
	Emergency landing	8			
	Lack of adherence to SOP for take-off procedure in terms of maintaining adequate 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 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 the airsite and airport topology.	142			
	Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	143			
	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 driver	148			
	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			
	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 landings	160			
	Lack of adherence to SOP in terms of ATCO and approach or ground controller communication	163			
	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 omitted	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 distribution	129			
	Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	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			
	Traffic controller tiredness - Inadequate workload distribution	137			

Code	Identifiable precursors	No. SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of 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 distribution	147			
	Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	148			
	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 - RCWS	205			
	Lack of adherence to ICAO Annex 14 and related documents in terms of nonrestricted view on airside from TWR	166			
	Lack of adherence to SOP in terms of awareness on supporting systems (warning) - RIMCAS.	156			
	Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of Runway Conflict Warning System.	172			
30	TO32B12	144	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
	Pilot tiredness - Inadequate workload distribution	167			
	Flaws in pilot requirements definition process and/or training methodology	168			
	Runway confusion	1			
	Adverse weather / poor visibility conditions / darkness	6			
	Taxiway confusion	7			
	Emergency landing	8			
	Lack of adherence to SOP for take-off procedure in terms of maintaining adequate 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 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 the airside and airport topology.	142			
	Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	143			
	Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airside 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 driver	148			
	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			
	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 landings	160			
	Lack of adherence to SOP in terms of ATCO and approach or ground controller communication	163			
	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 omitted	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 distribution	129			
	Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	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			
	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			

Code	Identifiable precursors	No. SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	Lack of adherence to ICAO Annex 14 and related documents in terms of airside lights distribution	147			
	Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	148			
	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 - RCWS	205			
	Lack of adherence to ICAO Annex 14 and related documents in terms of nonrestricted view on airside from TWR	166			
	Lack of adherence to SOP in terms of awareness on supporting systems (warning) - RIMCAS.	156			
	Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of Runway Conflict Warning System.	172			
31 TO32B13	Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airside or / and aircraft / vehicle proximity	144	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
	Pilot tiredness - Inadequate workload distribution	167			
	Flaws in pilot requirements definition process and/or training methodology	168			
	Runway confusion	1			
	Adverse weather / poor visibility conditions / darkness	6			
	Taxiway confusion	7			
	Emergency landing	8			
	Lack of adherence to SOP for take-off procedure in terms of maintaining adequate 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 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 the airside and airport topology.	142			
	Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	143			
	Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airside 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 driver	148			
	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			
	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 landings	160			
	Lack of adherence to SOP in terms of ATCO and approach or ground controller communication	163			
	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 omitted	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 distribution	129			
	Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	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			
	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 ICAO Annex 14 and related documents in terms of airside lights distribution	147			

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations	
	Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	148					
	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 - RCWS	205					
	Lack of adherence to ICAO Annex 14 and related documents in terms of nonrestricted view on airsite from TWR	166					
	Lack of adherence to SOP in terms of awareness on supporting systems (warning) - RIMCAS.	156					
	Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of Runway Conflict Warning System.	172					
ESD 36	Code	Identifiable Precursors	No.	Technology	Human	Organisation	System of Organisations
1	TO36F11111	Adverse weather / poor visibility conditions / darkness	6		12; 19;	44	46; 48; 50; 51; 52; 53; 54; 55; 58; 59; 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 process and/or training methodology	130				
		Lack of adherence to SOP for GND movements.	141				
2	TO36F11112	Flaws in ground equipment maintenance process	128		12; 19;	44	46; 50; 51; 59; 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 process and/or training methodology	130				
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment	261				
3	TO36F1112	Adverse weather / poor visibility conditions / darkness	6		12; 19;	44	46; 48; 50; 51; 52; 53; 54; 55; 59; 60; 62; 63
		Flaws in ground equipment maintenance process	128				
		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				
		Lack of adherence to SOP for GND movements.	141				
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment	261				
4	TO36F11211	Lack of adherence to SOP for GND movements. Poor execution of parking / docking /pushback procedure	138		12; 19;	44	46; 50; 51; 54; 55; 58; 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	151				
		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	6		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 distribution	129				
		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130				
		Lack of adherence to SOP for GND movements. Poor execution of parking / docking /pushback procedure	138				
6	TO36F1122	Adverse weather / poor visibility conditions / darkness	6		12; 19;	44	46; 48; 50; 51; 59; 60; 61; 62; 63
		Taxiway incursion	9				
		Inadvertent deviation from cleared taxi route	131				
		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 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 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				
7	TO36F1211	Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	127		12; 19;	44	46; 50; 51; 52; 53; 59; 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	155				
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 of the system / product compliance with requirements - Ground equipment	261				
9	TO36F1213	Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129		12; 19;	44	46; 50; 51; 59; 60; 61; 62; 63

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130				
10 TO36F1214	Lack of adherence to SOP for GND movements in terms of flight crew - ground crew communication.	126		12; 19;	44	46; 50; 51; 54; 55; 58; 59; 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 process and/or training methodology	130				
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168				
11 TO36F122	Flaws in ground equipment maintenance process	128		12; 19;	44	46; 50; 51; 59; 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 process and/or training methodology	130				
	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 current situation on the airsite or / and aircraft / vehicle proximity	144				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment	261				
12 TO36F1311	Adverse weather / poor visibility conditions / darkness	6		12; 19;	44	46; 50; 51; 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
	Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	127				
	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 separation / clearance	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 driver	148				
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 process and/or training methodology	130				
	Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129				
14 TO36F1313	Adverse weather / poor visibility conditions / darkness	6		12; 19;	44	46; 48; 50; 51; 52; 53; 54; 55; 59; 60; 61; 62; 63
	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. 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 sufficient separation / clearance	143				
	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				
15 TO36F1314	Adverse weather / poor visibility conditions / darkness	6		12; 19;	44	46; 48; 50; 51; 54; 55; 59; 60; 61; 62; 63
	Inadvertent deviation from cleared taxi route	131				
	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. 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 sufficient separation / clearance	143				
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168				
16 TO36F132	Adverse weather / poor visibility conditions / darkness	6		12; 19;	44	46; 48; 50; 51; 52; 53; 59; 60; 61; 62; 63
	Taxiway incursion	9				
	Inadvertent deviation from cleared taxi route	131				
	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. 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 sufficient separation / clearance	143				
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168				
17 TO36F1411	Adverse weather / poor visibility conditions / darkness	6		12; 19;	44	46; 48; 50; 51; 52; 53; 54; 55; 59; 60; 62; 63
	Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	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 separation / clearance	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 driver	148					
18	TO36F1412	Stand confusion	10		44	50; 51; 52; 53; 54; 55; 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 the airsite and airport topology.	142				
		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. Brake failure)	124	5; 7; 9;	12; 19;	44	46; 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				
		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				
20	TO36F14132	Flaws in traffic controller requirements definition process and/or training methodology	145		12; 19;	44	46; 51; 54; 55; 58; 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	151				
		Inadequate stall recovery procedure for the aircraft	152				
		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; 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				
22	TO36F14134	Adverse weather / poor visibility conditions / darkness	6		12; 19;	44	46; 48; 50; 51; 52; 53; 54; 55; 59; 60; 61; 62; 63
		Lack of adherence to SOP for GND movements in terms of marshalling procedure	125				
		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				
23	TO36F14141	Adverse weather / poor visibility conditions / darkness	6		12; 19;	44	46; 48; 50; 51; 52; 53; 54; 55; 59; 60; 61; 62; 63
		Taxiway incursion	9				
		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				
		Lack of adherence to SOP for GND movements.	141				
24	TO36F14142	Taxiway incursion	9		12; 19;	44	46; 50; 51; 59; 60; 61; 62; 63
		Flaws in ground equipment maintenance process	128				
		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				
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Ground equipment	261				
25	TO36F142	Adverse weather / poor visibility conditions / darkness	6		12; 19;	44	46; 48; 50; 51; 59; 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 process and/or training methodology	130				
		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				
II + I		0					
26	TO36B21	not identifiable at that level		5; 7; 9;	12; 19;	44	46; 48; 50; 51; 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
		Adverse weather / poor visibility conditions / darkness	6				
		Taxiway incursion	9				
		Stand confusion	10				
		Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure)	124				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations	
	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 communication.	126					
	Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	127					
	Flaws in ground equipment maintenance process	128					
	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					
	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 /pushback procedure	138					
	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 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 sufficient separation / clearance	143					
	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 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					
	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 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 - Ground equipment	261					
27	TO36B22	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	5; 7; 9;	12; 19;	44	46; 48; 50; 51; 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
		Adverse weather / poor visibility conditions / darkness	6				
		Taxiway incursion	9				
		Stand confusion	10				
		Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure)	124				
		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 communication.	126				
		Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	127				
		Flaws in ground equipment maintenance process	128				
		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				
		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 /pushback procedure	138				
		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 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 sufficient separation / clearance	143				
		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 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				
		Current airport diagram not reflecting critical changes	155				
		Pilot tiredness - Inadequate workload distribution	167				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	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 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 - Ground equipment	261				
28 TO36B23	Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	143	5; 7; 9;	12; 19;	44	46; 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	6				
	Taxiway incursion	9				
	Stand confusion	10				
	Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure)	124				
	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 communication.	126				
	Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	127				
	Flaws in ground equipment maintenance process	128				
	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				
	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 /pushback procedure	138				
	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 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 sufficient separation / clearance	143				
	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 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				
	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 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 - Ground equipment	261				
29 TO36B24	Lack of adherence to emergency procedures - RWY collision avoidance	135	5; 7; 9;	12; 19;	44	46; 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	6				
	Taxiway incursion	9				
	Stand confusion	10				
	Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure)	124				
	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 communication.	126				
	Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	127				
	Flaws in ground equipment maintenance process	128				
	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				
	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				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	Lack of adherence to SOP for GND movements. Poor execution of parking / docking / pushback procedure	138				
	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 SOP for GND movements. Lack of awareness of own position on the airtside and airport topology.	142				
	Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	143				
	Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airtside 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 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				
	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 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 - Ground equipment	261				
III + II + I	0					
30 TO36B11	not identifiable on that level		5; 7; 9;	12; 19;	44	46; 48; 50; 51; 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
	Adverse weather / poor visibility conditions / darkness	6				
	Taxiway incursion	9				
	Stand confusion	10				
	Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure)	124				
	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 communication.	126				
	Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	127				
	Flaws in ground equipment maintenance process	128				
	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				
	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 / pushback procedure	138				
	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 SOP for GND movements. Lack of awareness of own position on the airtside and airport topology.	142				
	Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	143				
	Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airtside 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 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				
	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 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 - Ground equipment	261				
	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 separation / clearance	143				
	Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airtside or / and aircraft / vehicle proximity	144				
	Pilot tiredness - Inadequate workload distribution	167				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations	
31	TO36B12	Flaws in pilot requirements definition process and/or training methodology	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	144	5; 7; 9;	12; 19;	44	46; 48; 50; 51; 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
		Adverse weather / poor visibility conditions / darkness	6				
		Taxiway incursion	9				
		Stand confusion	10				
		Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure)	124				
		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 communication.	126				
		Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	127				
		Flaws in ground equipment maintenance process	128				
		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				
		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 /pushback procedure	138				
		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 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 sufficient separation / clearance	143				
		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 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				
		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 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 - Ground equipment	261					
	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 separation / clearance	143					
	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 tiredness - Inadequate workload distribution	167					
	Flaws in pilot requirements definition process and/or training methodology	168					
32	TO36B13	Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129	5; 7; 9;	12; 19;	44	46; 48; 50; 51; 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130				
		Lack of adherence to SOP for GND movements.	141				
		Adverse weather / poor visibility conditions / darkness	6				
		Taxiway incursion	9				
		Stand confusion	10				
		Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure)	124				
		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 communication.	126				
		Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	127				
		Flaws in ground equipment maintenance process	128				
		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				
		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					

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations	
	Lack of adherence to SOP for GND movements. Poor execution of parking / docking / pushback procedure	138					
	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 SOP for GND movements. Lack of awareness of own position on the airside and airport topology.	142					
	Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	143					
	Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airside 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 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					
	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 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 - Ground equipment	261					
	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 separation / clearance	143					
	Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airside or / and aircraft / vehicle proximity	144					
	Pilot tiredness - Inadequate workload distribution	167					
	Flaws in pilot requirements definition process and/or training methodology	168					
33	TO36B14	Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129	5; 7; 9;	12; 19;	44	46; 48; 50; 51; 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
		Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130				
		Lack of adherence to SOP for GND movements.	141				
		Adverse weather / poor visibility conditions / darkness	6				
		Adverse weather / poor visibility conditions / darkness	6				
		Taxiway incursion	9				
		Stand confusion	10				
		Flaws in manufacturer quality control process - taxiing related control system (e.g. Brake failure)	124				
		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 communication.	126				
		Lack of adherence to SOP for GND movements in terms of clearance providing by the controller.	127				
		Flaws in ground equipment maintenance process	128				
		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				
		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 / pushback procedure	138				
		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 SOP for GND movements. Lack of awareness of own position on the airside and airport topology.	142				
		Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	143				
		Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airside 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 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				
		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 of the system / product compliance with requirements - marshalling/rolling/taxiing control related system and components (incl. brake)	196				

Code	Identifiable precursors	No.	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 - Ground equipment	261				
	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 separation / clearance	143				
	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 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 instruments	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	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 protecting of critical aircraft systems against contamination	233				
	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				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	Lack of adherence to SOP in terms of communication between ATC and pilot / vehicle driver	148				
	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				
	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).	225				
	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 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299				
	Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. Navigational aid failure.	303				
	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 clearance instruction	307				
	Not recognized ground Navais System failure not reflected in NOTAM messages	308				
	Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)	410				
	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 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 components (e.g. ILS)	490				
	Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492				
	Flaws in manufacturer quality control process - Onboard navigational systems and components.	493				
	Unintuitive and / or error prone system manual - FMS	494				
	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 approach and landing	245				
	Flaws in CRM training procedures	263				
	Lack of adherence to the main CRM rules	264				
	Imbalanced and inappropriate relation between cpt and his subordinates	304				
43 AL35B3222	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MSAW System	411	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
	Adverse weather / poor visibility conditions / darkness	6				
	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				
	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 protecting of critical aircraft systems against contamination	233				
	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				
	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				
	Current airport diagram not reflecting critical changes	155				
	Pilot tiredness - Inadequate workload distribution	167				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	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).	225				
	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 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299				
	Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. Navigational aid failure.	303				
	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 clearance instruction	307				
	Not recognized ground Navais System failure not reflected in NOTAM messages	308				
	Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)	410				
	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 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 components (e.g. ILS)	490				
	Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492				
	Flaws in manufacturer quality control process - Onboard navigational systems and components.	493				
	Unintuitive and / or error prone system manual - FMS	494				
	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 approach and landing	245				
	Flaws in CRM training procedures	263				
	Lack of adherence to the main CRM rules	264				
	Imbalanced and inappropriate relation between cpt and his subordinates	304				
44 AL35B3223	MSAW warning	51	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
	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 immediate answer on supporting systems warning. MSAW warning.	495				
	Adverse weather / poor visibility conditions / darkness	6				
	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				
	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 protecting of critical aircraft systems against contamination	233				
	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				
	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				
	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).	225				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	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 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299				
	Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. Navigational aid failure.	303				
	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 clearance instruction	307				
	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.)	410				
	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 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 components (e.g. ILS)	490				
	Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492				
	Flaws in manufacturer quality control process - Onboard navigational systems and components.	493				
	Unintuitive and / or error prone system manual - FMS	494				
	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 approach and landing	245				
	Flaws in CRM training procedures	263				
	Lack of adherence to the main CRM rules	264				
	Imbalanced and inappropriate relation between cpt and his subordinates	304				
45	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 instruments	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	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 protecting of critical aircraft systems against contamination	233			
		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			
		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			
		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).	225			
		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			

Code	Identifiable precursors	No.	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 - FMS subsystems and components (autopilot incl.)	299					
	Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. Navigational aid failure.	303					
	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 clearance instruction	307					
	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.)	410					
	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 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 components (e.g. ILS)	490					
	Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491					
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492					
	Flaws in manufacturer quality control process - Onboard navigational systems and components.	493					
	Unintuitive and / or error prone system manual - FMS	494					
	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 approach and landing	245					
	Flaws in CRM training procedures	263					
	Lack of adherence to the main CRM rules	264					
	Imbalanced and inappropriate relation between cpt and his subordinates	304					
IV	GPWS failure						
46	AL35B11	Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of GPWS	293	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
		Adverse weather / poor visibility conditions / darkness	6				
		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				
		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 protecting of critical aircraft systems against contamination	233				
		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				
		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				
		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).	225				
		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 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299				
		Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. Navigational aid failure.	303				
		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 clearance instruction	307				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations	
	Not recognized ground Nav aids System failure not reflected in NOTAM messages	308					
	Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)	410					
	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 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 components (e.g. ILS)	490					
	Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491					
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492					
	Flaws in manufacturer quality control process - Onboard navigational systems and components.	493					
	Unintuitive and / or error prone system manual - FMS	494					
	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 approach and landing	245					
	Flaws in CRM training procedures	263					
	Lack of adherence to the main CRM rules	264					
	Imbalanced and inappropriate relation between cpt and his subordinates	304					
	Adverse weather / poor visibility conditions / darkness	6					
	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	145					
	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 approach and landing	245					
	Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain)	278					
	Premature descent to DA(H) before G/S intercept or premature descent to MDA(H) before final-descent-point / FAF	281					
	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.	295					
	Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of MSAW system.	302					
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MSAW System	411					
	Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. MSAW warning.	495					
47	AL35B12	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149	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
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150				
		Flaws in aircraft system maintenance process definition - GPWS system components	485				
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - GPWS system components	486				
		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 instruments	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	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 protecting of critical aircraft systems against contamination	233				
		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				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	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				
	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).	225				
	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 of the system / product compliance with requirements - FMS subsystems and components (autopilot incl.)	299				
	Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. Navigational aid failure.	303				
	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 clearance instruction	307				
	Not recognized ground Navais System failure not reflected in NOTAM messages	308				
	Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)	410				
	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 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 components (e.g. ILS)	490				
	Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492				
	Flaws in manufacturer quality control process - Onboard navigational systems and components.	493				
	Unintuitive and / or error prone system manual - FMS	494				
	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 approach and landing	245				
	Flaws in CRM training procedures	263				
	Lack of adherence to the main CRM rules	264				
	Imbalanced and inappropriate relation between cpt and his subordinates	304				
	Adverse weather / poor visibility conditions / darkness	6				
	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	145				
	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 approach and landing	245				
	Incorrect or inappropriate radar vectoring by ATC (i.e., below MVA and/or toward high terrain)	278				
	Premature descent to DA(H) before G/S intercept or premature descent to MDA(H) before final-descent-point / FAF	281				
	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.	295				
	Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of MSAW system.	302				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MSAW System	411				
	Lack of adherence to SOP. Lack of awareness and immediate answer on supporting systems warning. MSAW warning.	495				

	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
		incorrect configuration					
1	TO05B111	Pilot tiredness - Inadequate workload distribution	167		13; 22;	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 SOP for take-off procedure in terms of determining of aircraft configuration.	198				
		Incorrect stab-trim setting	258				
		Undetected incorrect takeoff configuration	259				
2	TO05B112	Pilot tiredness - Inadequate workload distribution	167		13; 22;	38; 41;	50; 51; 54; 55; 58; 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	151				
		Flaws in pilot requirements definition process and/or training methodology	168				
3	TO05B12	Unintuitive and / or error prone system manual - FMC	217		13; 22;	38; 41;	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				
4	TO05B21	Pilot tiredness - Inadequate workload distribution	167		13; 22;	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 the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151				
		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; 59; 60; 61; 62; 63
		Flaws in pilot requirements definition process and/or training methodology	168				
6	TO05B311	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System	229	3;	13; 22;	38; 41;	50; 51; 54; 55; 58; 59; 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 configuration before application of take-off power.	201				
		Incorrect stab-trim setting	258				
		Undetected incorrect takeoff configuration	259				
7	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; 59; 60; 61; 62; 63
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150				
		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 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 configuration before application of take-off power.	201				
		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; 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 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				
		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 configuration before application of take-off power.	201				
		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; 59; 60; 61; 62; 63
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components	230				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of 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 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 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 process and/or training methodology	149	2;	13; 22;	38; 41;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150					
	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 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 configuration before application of take-off power.	201					
	Incorrect stab-trim setting	258					
	Undetected incorrect takeoff configuration	259					
11	TO05B33	not identifiable at the moment		13; 22;	38; 41;	50; 51; 54; 55; 58; 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	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 configuration before application of take-off power.	201					
	Incorrect stab-trim setting	258					
	Undetected incorrect takeoff configuration	259					
12	TO05B411	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
	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 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 configuration before application of take-off power.	201					
	Incorrect stab-trim setting	258					
	Undetected incorrect takeoff configuration	259					
13	TO05B412	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
	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 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 configuration before application of take-off power.	201					
	Incorrect stab-trim setting	258					
	Undetected incorrect takeoff configuration	259					
14	TO05B42	not identifiable at that level		13; 22;	38; 41;	50; 51; 54; 55; 58; 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	151					
	Unintuitive and / or error prone system manual - FMC	217					

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations	
	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 configuration before application of take-off power.	201					
	Incorrect stab-trim setting	258					
	Undetected incorrect takeoff configuration	259					
15	TO05B51	Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate	45		13; 22;	38; 41;	48; 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				
		Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling	200				
		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				
		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 configuration before application of take-off power.	201				
		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 rejected take-off	46				
		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				
16	TO05B52	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				
		Flaws in pilot requirements definition process and/or training methodology	168				
		Flaws in aircraft system maintenance process definition - Braking system related components	268				
		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 configuration before application of take-off power.	201				
		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 rejected take-off	46				
		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				
17	TO05B53	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	199				
		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 configuration before application of take-off power.	201				
		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 rejected take-off	46				
		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				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207				
TO05B61	not identifiable at that level		2; 3;	13; 22;	38; 41;	50; 51; 54; 55; 58; 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	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 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 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	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 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				
19 TO05B622	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; 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 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 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 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	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 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				
20 TO05B6211	System failure affecting the operation of primary instruments / displays or standby instruments	26	2; 3;	13; 22;	38; 41;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63
	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 components	161				
	Flaws in manufacturer quality control process - Stickshaker system components	266				
	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	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 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 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	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 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 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 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	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 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				
22 TO05B71	not identifiable at the moment		2; 3; 6;	13; 22;	38; 41;	48; 50; 51; 54; 55; 58; 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	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 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 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				

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 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	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				
	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				
	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 components	161				
	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	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				
	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				
23	TO05B72					
	Pilot tiredness - Inadequate workload distribution	167	2; 3; 6;	13; 22;	38; 41;	48; 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				
	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 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 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	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 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				
	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 components	161				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	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	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				
	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	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				
	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 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 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	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 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				
	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 components	161				
	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	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				
	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	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				
	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 configuration before application of take-off power.	201				
	Incorrect stab-trim setting	258				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	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 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	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 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				
	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 components	161				
	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	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				
	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				
ESD 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				
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; 60; 61; 62; 63
	Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.	210				
3	TO06B1221 Inadequate aircraft de-icing / anti-icing	180		13;	41;	48; 50; 51; 54; 55; 59; 60; 61; 62; 63
	Applied de-icing / anti-icing method is not sufficient for predicted conditions	228				
4	TO06B1222 Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129		13;	41;	48; 50; 51; 54; 55; 59; 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				
5	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				
	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	309				
	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 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				
6	TO06B212 Pilot tiredness - Inadequate workload distribution	167		13;	41;	48; 50; 51; 54; 55; 59; 60; 61; 62; 63
	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	309				
	Convective weather encounter	18				
	Extreme icing conditions encounter	20				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	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				
	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				
7 TO06B22	Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129		13;	41;	48; 50; 51; 54; 55; 59; 60; 61; 62; 63
	Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130				
	Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.	210				
	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 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				
8 TO06B231	Extreme icing condition and / or heavy snow. Break in airport operation due to adverse weather or / and necessity of RWY surface maintenance.	31		13;	41;	48; 50; 51; 54; 55; 59; 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 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				
9 TO06B232	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 - anti-ice fluid HOT	213				
	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 distribution	129				
	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.	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; 59; 60; 61; 62; 63
	Extreme icing conditions encounter	20				
	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 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 TO06B311	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				
	Flaws in pilot requirements definition process and/or training methodology	168				
	Lack of adherence to TO procedure in terms of anti-ice protection	297				
	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 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				
	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				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	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				
	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)	212				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - anti-ice 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				
12	TO06B312	Adverse weather / poor visibility conditions / darkness	6	13;	41;	48; 50; 51; 54; 55; 59; 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 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				
	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 distribution	129				
	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				
	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 of the system / product compliance with requirements - anti-ice 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				
13	TO06B32	Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129	13;	41;	48; 50; 51; 54; 55; 59; 60; 61; 62; 63
	Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130				
	Lack of adherence to SOP in terms of (preservice) de-icing / anti-icing procedure.	210				
	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 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				
	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 distribution	129				
	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				
	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 of the system / product compliance with requirements - anti-ice 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				
14	TO06B331	Extreme icing condition and / or heavy snow. Break in airport operation due to adverse weather or / and necessity of RWY surface maintenance.	31	13;	41;	48; 50; 51; 54; 55; 59; 60; 61; 62; 63
	Convective weather encounter	18				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	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				
	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				
	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 distribution	129				
	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				
	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 of the system / product compliance with requirements - anti-ice 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				
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 - anti-ice fluid HOT	213				
	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 distribution	129				
	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.	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 distribution	129				
	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				
	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 of the system / product compliance with requirements - anti-ice 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				
16	TO06B333					
	Convective weather encounter	18		13;	41;	48; 50; 51; 54; 55; 59; 60; 61; 62; 63
	Extreme icing conditions encounter	20				
	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 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				
	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				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	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				
	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)	212				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - anti-ice 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				
17	TO06B41	not identifiable at that level		13;	41;	48; 50; 51; 54; 55; 59; 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 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				
	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 distribution	129				
	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				
	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 of the system / product compliance with requirements - anti-ice 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	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 weather or / and necessity of RWY surface maintenance.	31				
	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				
	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)	212				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - anti-ice fluid HOT	213				
	Lack of adherence to TO procedure in terms of anti-ice protection	297				
	Flaws in manufacturer quality control process - anti-ice fluid specifications (HOT)	310				
18	TO06B4211	System failure affecting the operation of primary instruments / displays or standby instruments		13;	41;	48; 50; 51; 54; 55; 59; 60; 61; 62; 63
	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 components	161				
	Flaws in manufacturer quality control process - Stickshaker system components	266				
	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 process and/or training methodology	130				

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	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 distribution	129				
	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				
	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 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	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 weather or / and necessity of RWY surface maintenance.	31				
	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				
	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)	212				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - antiice fluid HOT	213				
	Lack of adherence to TO procedure in terms of antiice protection	297				
	Flaws in manufacturer quality control process - anti-ice fluid specifications (HOT)	310				
19	TO06B4212					
	Contaminated wing	12		13;	41;	48; 50; 51; 54; 55; 59; 60; 61; 62; 63
	Extreme icing conditions encounter	20				
	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 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				
	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 distribution	129				
	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				
	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 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	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 weather or / and necessity of RWY surface maintenance.	31				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	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				
	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)	212				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - anti-ice fluid HOT	213				
	Lack of adherence to TO procedure in terms of anti-ice protection	297				
	Flaws in manufacturer quality control process - anti-ice fluid specifications (HOT)	310				
20	Pilot tiredness - Inadequate workload distribution	167		13;	41;	48; 50; 51; 54; 55; 59; 60; 61; 62; 63
	Flaws in pilot requirements definition process and/or training methodology	168				
	Lack of adherence to SOP in terms of awareness on supporting systems warning - stickshaker	197				
	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 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				
	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 distribution	129				
	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				
	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 of the system / product compliance with requirements - anti-ice 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	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 weather or / and necessity of RWY surface maintenance.	31				
	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				
	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)	212				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - anti-ice fluid HOT	213				
	Lack of adherence to TO procedure in terms of anti-ice protection	297				
	Flaws in manufacturer quality control process - anti-ice fluid specifications (HOT)	310				
ESD 8	Code	Identifiable Precursors	Technology	Human	Organisation	System of Organisations
0		Aircraft encounters a performance decreasing windshear after rotation				
		Convective weather encounter		22;	36; 37; 39;	48; 50; 51; 54; 55; 58; 59; 60; 61; 62;
		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).				
1	TO08B111	Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.		22;	36; 37; 39;	48; 50; 51; 54; 55; 58; 59; 60; 61; 62;
		Convective weather encounter				
		Frontal surface encounter				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of 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 locations (e.g. mountains).	225				
2 TO08B112	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149		22;	36; 37; 39;	48; 50; 51; 54; 55; 58; 59; 60; 61; 62;
	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 - LLWAS system	356				
	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 locations (e.g. mountains).	225				
3 TO08B113	Traffic controller tiredness - Inadequate workload distribution	137		22;	36; 37; 39;	48; 50; 51; 54; 55; 58; 59; 60; 61; 62;
	Flaws in traffic controller requirements definition process and/or training methodology	145				
	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	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				
4 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; 58; 59; 60; 61; 62;
	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 locations (e.g. mountains).	225				
5 TO08B122	System failure affecting the operation of primary instruments / displays or standby instruments	26		22;	36; 37; 39;	48; 50; 51; 54; 55; 58; 59; 60; 61; 62;
	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 - PWS system	253				
	Flaws in manufacturer quality control process - PWS system components	298				
	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 locations (e.g. mountains).	225				
6 TO08B13	Pilot tiredness - Inadequate workload distribution	167		22;	36; 37; 39;	48; 50; 51; 54; 55; 58; 59; 60; 61; 62;
	Flaws in pilot requirements definition process and/or training methodology	168				
	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 locations (e.g. mountains).	225				
7 TO08B21	not identifiable at that level			22;	36; 37; 39;	48; 50; 51; 54; 55; 58; 59; 60; 61; 62;
	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 locations (e.g. mountains).	225				
	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 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	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	253				
	Flaws in manufacturer quality control process - PWS system components	298				
	Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.	355				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - LLWAS system	356				
8 TO08B221	Convective weather / turbulence / windshear or crosswind conditions during take-off	32		22;	36; 37; 39;	48; 50; 51; 54; 55; 58; 59; 60; 61; 62;

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	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 locations (e.g. mountains).	225				
	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 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	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	253				
	Flaws in manufacturer quality control process - PWS system components	298				
	Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.	355				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - LLWAS system	356				
9 TO08B222	Pilot tiredness - Inadequate workload distribution	167		22;	36; 37; 39;	48; 50; 51; 54; 55; 58; 59; 60; 61; 62;
	Flaws in pilot requirements definition process and/or training methodology	168				
	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 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	137				
	Flaws in traffic controller requirements definition process and/or training methodology	145				
	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	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	253				
	Flaws in manufacturer quality control process - PWS system components	298				
	Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.	355				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - LLWAS system	356				
10 TO08B31	not identifiable at that level			22;	36; 37; 39;	48; 50; 51; 54; 55; 58; 59; 60; 61; 62;
	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 locations (e.g. mountains).	225				
	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 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	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	253				
	Flaws in manufacturer quality control process - PWS system components	298				
	Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.	355				

Code	Identifiable precursors	No.	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 - 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				
	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; 58; 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	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 locations (e.g. mountains).	225				
	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 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	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	253				
	Flaws in manufacturer quality control process - PWS system components	298				
	Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.	355				
	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				
	Lack of adherence to emergency procedures - WEM	173				
12 TO08B33	Pilot tiredness - Inadequate workload distribution	167		22;	36; 37; 39;	48; 50; 51; 54; 55; 58; 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	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 locations (e.g. mountains).	225				
	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 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	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	253				
	Flaws in manufacturer quality control process - PWS system components	298				
	Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.	355				
	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				
	Lack of adherence to emergency procedures - WEM	173				
13 TO08B34	Pilot tiredness - Inadequate workload distribution	167		22;	36; 37; 39;	48; 50; 51; 54; 55; 58; 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	18				
	Frontal surface encounter	64				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of 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 locations (e.g. mountains).	225				
	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 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	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	253				
	Flaws in manufacturer quality control process - PWS system components	298				
	Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.	355				
	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				
	Lack of adherence to emergency procedures - WEM	173				
ESD 11 Code	Identifiable Precursors	No.	Technology	Human	Organisation	System of Organisations
1	Fire on-board aircraft					
1 ER11B11	Cargo loading unsecured / shift	17	9;			50; 51; 54; 55; 58; 59; 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 process and/or training methodology	130				
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168				
	Lack of adherence to regulations concerning transport of DGR goods	359				
2 ER11B1211	Wildlife incursion	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; 54; 55; 58; 59; 60; 61; 62; 63
	Contaminated Runway	39				
	Midair collision	66				
	Collision with ground obstacle	67				
	Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216				
	Separation of structural element / component of the aircraft during take-off or landing	360				
3 ER11B1212	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149	4;			50; 51; 55; 56; 59; 60; 61; 62; 63
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150				
	Flaws in aircraft system maintenance process definition - Fuel system components	361				
4 ER11B1213	Vehicle driver / equipment operator / ground agent tiredness - Inadequate workload distribution	129	4;			50; 51; 55; 56; 59; 60; 61; 62; 63
	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				
5 ER11B122	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149	4;			50; 51; 55; 56; 59; 60; 61; 62; 63
	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 - Fuel system components	352				
	Flaws in aircraft system maintenance process definition - Fuel system components	361				
6 ER11B13	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149	5;			50; 51; 55; 56; 59; 60; 61; 62; 63
	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 - Hydraulic system components	333				
	Flaws in aircraft system maintenance process definition - Hydraulic System	334				
7 ER11B14	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149	2; 7;			50; 51; 55; 56; 59; 60; 61; 62; 63
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150				
	Inadequate maintenance of fire vulnerable aircraft parts or components	353				

Code	Identifiable precursors	No.	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 in terms of fire resistance	354				
8 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	168				
	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 components	454				
	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				
9 ER11B16	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 components	464				
	Flaws in manufacturer quality control process - APU systems and / or components	465				
	Flaws in aircraft system maintenance process definition - APU systems and / or components	466				
10 ER11B21	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149	2;			50; 51; 55; 56; 59; 60; 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 ER11B22	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				
	Lack of adherence to regulations concerning transport of DGR goods	359				
12 ER11B31	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	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; 54; 55; 56; 58; 59; 60; 61; 62; 63
	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 detection system components	475				
	Flaws in manufacturer quality control process - Fire detection system components	476				
	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 distribution	129				
	Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130				
	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	168				
	Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of 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				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	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 - Fuel system components	352				
	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	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 of the system / product compliance with requirements - Engine systems and / or components	454				
	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				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components	464				
	Flaws in manufacturer quality control process - APU systems and / or components	465				
	Flaws in aircraft system maintenance process definition - APU systems and / or components	466				
	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				
13 ER11B32	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; 61; 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 of the system / product compliance with requirements - Fire warning system	478				
	Flaws in manufacturer quality control process - Fire warning system	479				
	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 distribution	129				
	Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130				
	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	168				
	Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of 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 of the system / product compliance with requirements - Fuel system components	352				
	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	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 of the system / product compliance with requirements - Engine systems and / or components	454				
	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				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components	464				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations	
	Flaws in manufacturer quality control process - APU systems and / or components	465					
	Flaws in aircraft system maintenance process definition - APU systems and / or components	466					
	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					
14	ER11B33	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire deection system components	475	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; 54; 55; 56; 58; 59; 60; 61; 62; 63
	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					
	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 distribution	129					
	Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130					
	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	168					
	Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of 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 of the system / product compliance with requirements - Fuel system components	352					
	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	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 of the system / product compliance with requirements - Engine systems and / or components	454					
	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					
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components	464					
	Flaws in manufacturer quality control process - APU systems and / or components	465					
	Flaws in aircraft system maintenance process definition - APU systems and / or components	466					
	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					
15	ER11B34	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; 54; 55; 56; 58; 59; 60; 61; 62; 63	
	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 distribution	129					
	Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130					
	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	168					

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of 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 of the system / product compliance with requirements - Fuel system components	352				
	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	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 of the system / product compliance with requirements - Engine systems and / or components	454				
	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				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components	464				
	Flaws in manufacturer quality control process - APU systems and / or components	465				
	Flaws in aircraft system maintenance process definition - APU systems and / or components	466				
	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				
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; 54; 55; 56; 58; 59; 60; 61; 62; 63
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire extinguishing system components	480				
	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 distribution	129				
	Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130				
	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	168				
	Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of 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 of the system / product compliance with requirements - Fuel system components	352				
	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	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 of the system / product compliance with requirements - Engine systems and / or components	454				
	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				

Code	Identifiable precursors	No.	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 - APU systems and / or components	464				
	Flaws in manufacturer quality control process - APU systems and / or components	465				
	Flaws in aircraft system maintenance process definition - APU systems and / or components	466				
	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				
	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 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 components	474				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire detection system components	475				
	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 of the system / product compliance with requirements - Fire warning system	478				
	Flaws in manufacturer quality control process - Fire warning system	479				
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; 61; 62; 63
	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 - 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				
	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 distribution	129				
	Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130				
	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	168				
	Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of 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 of the system / product compliance with requirements - Fuel system components	352				
	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	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 of the system / product compliance with requirements - Engine systems and / or components	454				
	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				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components	464				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	Flaws in manufacturer quality control process - APU systems and / or components	465				
	Flaws in aircraft system maintenance process definition - APU systems and / or components	466				
	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				
	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 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 components	474				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire detection system components	475				
	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 of the system / product compliance with requirements - Fire warning system	478				
	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 ability to conduct their duties and/or the aircraft controllability	29	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
	Pilot tiredness - Inadequate workload distribution	167				
	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	22				
	Contaminated Runway	39				
	Midair collision	66				
	Collision with ground obstacle	67				
	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				
	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	168				
	Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of 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 of the system / product compliance with requirements - Fuel system components	352				
	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	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 of the system / product compliance with requirements - Engine systems and / or components	454				
	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				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components	464				
	Flaws in manufacturer quality control process - APU systems and / or components	465				
	Flaws in aircraft system maintenance process definition - APU systems and / or components	466				
	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				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	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 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 components	474				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire detection system components	475				
	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 of the system / product compliance with requirements - Fire warning system	478				
	Flaws in manufacturer quality control process - Fire warning system	479				
19 ER11B431	Flaws in pilot requirements definition process and/or training methodology	168	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
	Pilot tiredness - Inadequate workload distribution	167				
	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	22				
	Contaminated Runway	39				
	Midair collision	66				
	Collision with ground obstacle	67				
	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				
	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	168				
	Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of 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 of the system / product compliance with requirements - Fuel system components	352				
	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	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 of the system / product compliance with requirements - Engine systems and / or components	454				
	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				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components	464				
	Flaws in manufacturer quality control process - APU systems and / or components	465				
	Flaws in aircraft system maintenance process definition - APU systems and / or components	466				
	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				
	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 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 components	474				

Code	Identifiable precursors	No.	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 - Fire deection system components	475				
	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 of the system / product compliance with requirements - Fire warning system	478				
	Flaws in manufacturer quality control process - Fire warning system	479				
20 ER11B432	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; 54; 55; 56; 58; 59; 60; 61; 62; 63
	Flaws in pilot requirements definition process and/or training methodology	168				
	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 distribution	129				
	Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130				
	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	168				
	Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of 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 of the system / product compliance with requirements - Fuel system components	352				
	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	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 of the system / product compliance with requirements - Engine systems and / or components	454				
	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				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components	464				
	Flaws in manufacturer quality control process - APU systems and / or components	465				
	Flaws in aircraft system maintenance process definition - APU systems and / or components	466				
	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				
	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 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 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	476				
	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				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of 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; 54; 55; 56; 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 - fire detection and extinguishing procedure	483				
	Unintuitive and / or error prone system manual - fire extinguishing system	484				
	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 distribution	129				
	Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130				
	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	168				
	Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of 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 of the system / product compliance with requirements - Fuel system components	352				
	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	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 of the system / product compliance with requirements - Engine systems and / or components	454				
	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				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components	464				
	Flaws in manufacturer quality control process - APU systems and / or components	465				
	Flaws in aircraft system maintenance process definition - APU systems and / or components	466				
	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				
	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 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 components	474				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Fire detection system components	475				
	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 of the system / product compliance with requirements - Fire warning system	478				
	Flaws in manufacturer quality control process - Fire warning system	479				
22 ER11B45	Inadequate effectiveness of fire extinguishing system	221	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
	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				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	Flaws in manufacturer quality control process - Fire extinguishing system components	482				
	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149				
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150				
	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 distribution	129				
	Flaws in vehicle driver / equipment operator / ground agent requirements definition process and/or training methodology	130				
	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149				

Code	Identifiable precursors	No.	SPIs: System of Organisations		
			SPIs: Technology	SPIs: Human	SPIs: Organisation
ESD 31	Code				
	identifiable precursors	No.	Technology	Human	Organisation
	Aircraft are positioned on collision course				
1	ER31F53	Flaws in Airspace and Air Traffic planning procedures design process	323	19;	32; 33; 34; 35;
					47; 50; 51; 52; 53; 56; 57; 59; 60; 61; 62; 63
2	ER31B10	Flaws in Airspace and Air Traffic planning procedures design process	323	19;	32; 33; 34; 35;
		Inadequate coordination between ATM centers and/or ATC sectors	321		
		Flaws in conflict and separation minima infringement detection / elimination procedures	326		
3	ER31B91	Flaws in conflict and separation minima infringement detection / elimination procedures	326	19;	32; 33; 34; 35;
		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		
4	ER31B9211	Flaws in Airspace and Air Traffic planning procedures design process	323	19;	32; 33; 34; 35;
					47; 50; 51; 52; 53; 56; 57; 59; 60; 61; 62; 63
5	ER31B9212	Inadequate coordination between ATM centers and/or ATC sectors	321	19;	32; 33; 34; 35;
		Lack of adherence of airlines to time constraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data.	327		
		Flaws in Airspace and Air Traffic planning procedures design process	323		
6	ER31B922	Tactical or / and Planning Controller tiredness - Inadequate workload distribution	300	19;	32; 33; 34; 35;
		Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology	301		
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - MTC System	328		
7	ER31B923	Tactical or / and Planning Controller tiredness - Inadequate workload distribution	300	19;	32; 33; 34; 35;
		Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology	301		
8	ER31B93	Tactical or / and Planning Controller tiredness - Inadequate workload distribution	300	19;	32; 33; 34; 35;
		Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology	301		
		Inadequate coordination between ATM centers and/or ATC sectors	321		
		Flaws in Airspace and Air Traffic planning procedures design process	323		
9	ER31B94	Tactical or / and Planning Controller tiredness - Inadequate workload distribution	300	19;	32; 33; 34; 35;
		Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology	301		
		Inadequate coordination between ATM centers and/or ATC sectors	321		
10	ER31B5111	Flaws in Airspace and Air Traffic planning procedures design process	323	19;	32; 33; 34; 35;
		Lack of adherence of airlines to time constraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data.	327		
11	ER31B5112	Tactical or / and Planning Controller tiredness - Inadequate workload distribution	300	19;	32; 33; 34; 35;
		Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology	301		
		Failure to identify the pre-tactical conflict before it reach the tactical controller	330		
		Lack of adherence of airlines to declared Flight Plan.	329		
		Lack of adherence of airlines to time constraints and deadlines in terms of providing the Network Manager Operation Centre with obligatory data.	327		
12	ER31B512	Tactical or / and Planning Controller tiredness - Inadequate workload distribution	300	19;	32; 33; 34; 35;
		Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology	301		
13	ER31B513	Tactical or / and Planning Controller tiredness - Inadequate workload distribution	300	19;	32; 33; 34; 35;
		Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology	301		
		Lack of adherence to SOP for Airborne operation in terms of minimum separation	331		
14	ER31B514	Tactical or / and Planning Controller tiredness - Inadequate workload distribution	300	19;	32; 33; 34; 35;
		Flaws in Tactical or / and Planning Controller requirements definition process and/or training methodology	301		
		Inadequate coordination between ATM centers and/or ATC sectors	321		
15	ER31B521	Lack of English proficiency	132	19; 20;	32; 33; 34; 35;
		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		
16	ER31B522	Prolonged loss of communication (PLOC) between pilot and controller	73	19; 20; 21;	31; 32; 33; 34; 35;
		Traffic controller tiredness - Inadequate workload distribution	137		
		Flaws in traffic controller requirements definition process and/or training methodology	145		

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	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	168				
	Unintuitive and / or error prone system manual - communication equipment.	305				
	Incorrect use of communication equipment	336				
17	ER31B523	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				
	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 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 omitted	169				
18	ER31B53	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; 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 Rules of the Air - adherence to Controller clearance	296				
	Failure to comply with an altitude or speed restriction / constraint	315				
19	ER31F6111	Military activity in controlled airport or located within controlled area	339	19; 20; 21;	31; 32; 33; 34; 35;	47; 50; 51; 56; 57; 58; 59; 60; 61; 62; 63
20	ER31F6112	General aviation activity in controlled airport or located within controlled area	340	19; 20; 21;	31; 32; 33; 34; 35;	47; 50; 51; 56; 57; 58; 59; 60; 61; 62; 63
21	ER31F61211	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				
	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				
22	ER31F61212	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 driver	148				
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168				
	Hearback omitted	169				
23	ER31F6122	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; 56; 57; 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 Rules of the Air - adherence to Controller clearance	296				
24	ER31F6123	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; 25	27; 31; 32; 33; 34; 35; 39;	47; 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				
	Altimeter setting error	274				
	Lack of adherence to SOP for take-off procedure in terms of altimeter calibration.	294				
25	ER31F6124	System failure affecting the operation of primary instruments / displays or standby instruments	26	1; 3;	19; 20; 21;	31; 32; 33; 34; 35;
	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 - FMS subsystems and components (autopilot incl.)	299				
	Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)	306				
	Flaws in aircraft system maintenance process definition - FMS subsystems and components (autopilot incl.)	410				
	Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492				
	Flaws in manufacturer quality control process - Onboard navigational systems and components.	493				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations	
26	ER31F6125	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				
		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				
		Altitude deviation	312				
		Level bust (pilot lapse or late re-clearance by ATC)	313				
		Deviation from flight trajectory commanded by controller	343				
27	ER31F6126	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	ER31C6	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	ER31B611	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 instruments - ADS-B System	78				
30	ER31B612	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				
		Flaws in traffic controller requirements definition process and/or training methodology	145				
		Altitude deviation	312				
		Level bust (pilot lapse or late re-clearance by ATC)	313				
		Navigation deviation	317				
		Deviation from flight trajectory commanded by controller	343				
31	ER31B621	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				
		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	ER31B622	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 systems and components.	271				
		Flaws in manufacturer quality control process - Communication equipment systems and components.	272				
		Unintuitive and / or error prone system manual - communication equipment.	305				
		Incorrect use of communication equipment	336				
33	ER31B623	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				
		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				
		Pilot tiredness - Inadequate workload distribution	167				
		Flaws in pilot requirements definition process and/or training methodology	168				
		Hearback omitted	169				
34	ER31B63	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				
		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	ER31F71	Traffic controller tiredness - Inadequate workload distribution	137		19; 20; 21;	31; 32; 33; 34; 35;	47; 50; 51; 56; 57; 59; 60; 61; 62; 63
		Flaws in traffic controller requirements definition process and/or training methodology	145				
36	ER31B7	Traffic controller tiredness - Inadequate workload distribution	137		19; 20; 21;	31; 32; 33; 34; 35;	47; 50; 51; 56; 57; 59; 60; 61; 62; 63
		Flaws in traffic controller requirements definition process and/or training methodology	145				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	Flaws in conflict and separation minima infringement detection / elimination procedures	326				
37	ER31F81 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; 60; 61; 62; 63
38	ER31B81 Traffic controller tiredness - Inadequate workload distribution	137		19; 20; 21;	31; 32; 33; 34; 35;	47; 50; 51; 56; 57; 59; 60; 61; 62; 63
	Flaws in traffic controller requirements definition process and/or training methodology	145				
	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 systems and components.	271				
	Flaws in manufacturer quality control process - Communication equipment systems and components.	272				
	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				
	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				
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168				
	Hearback omitted	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				
	Flaws in pilot requirements definition process and/or training methodology	168				
	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)	313				
	Failure to comply with an altitude or speed restriction / constraint	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				
ii	ATC fails to detect and resolve the conflict					
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;	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 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 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 omitted	169				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	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				
	Altimeter setting error	274				
	Lack of adherence to SOP for take-off procedure in terms of altimeter calibration.	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.)	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				
	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	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 constraints 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 separation	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.)	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				
45 ER31B32	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - STCA System	351	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 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 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 omitted	169				
	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				
	Altimeter setting error	274				
	Lack of adherence to SOP for take-off procedure in terms of altimeter calibration.	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.)	299				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	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				
	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	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 constraints 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 separation	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.)	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				
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 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 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 omitted	169				
	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				
	Altimeter setting error	274				
	Lack of adherence to SOP for take-off procedure in terms of altimeter calibration.	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.)	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				
	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	321				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	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 constraints 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 separation	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.)	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				
47 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				
	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 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 omitted	169				
	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				
	Altimeter setting error	274				
	Lack of adherence to SOP for take-off procedure in terms of altimeter calibration.	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.)	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				
	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	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 constraints 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 separation	331				
	Incorrect use of communication equipment	336				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	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 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				
48 ER31B41	Lack of adherence to regulations concerning independent ATCO monitoring	346	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 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 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 omitted	169				
	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				
	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 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				
	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	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 constraints 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 separation	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.)	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				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
49 ER31B42	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				
	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 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 omitted	169				
	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				
	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 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				
	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	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 constraints 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 - MTC 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 separation	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.)	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				
50 ER31B43	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				
	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				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	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 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 omitted	169				
	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				
	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 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				
	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	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 constraints 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 separation	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.)	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				
51 ER31B44	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				
	Flaws in Airspace and Air Traffic planning procedures design process	323				
	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				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations	
	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 omitted	169					
	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					
	Altimeter setting error	274					
	Lack of adherence to SOP for take-off procedure in terms of altimeter calibration.	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.)	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					
	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	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 constraints 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 - MTCO 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 separation	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.)	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					
III	Flight crew fails to detect and resolve conflict						
52	ER31B21	Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ACAS installed on aircraft.	347	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 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 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 omitted	169				
		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				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	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 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				
	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	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 constraints 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 separation	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.)	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				
	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 of the system / product compliance with requirements - STCA System	351				
53 ER31B22	Failures affecting TCAS operation	74	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
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - ACAS system components	290				
	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 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 omitted	169				
	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				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	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 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				
	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	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 constraints 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 separation	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.)	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				
	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 of the system / product compliance with requirements - STCA System	351				
54 ER31B23	TCAS RA events (genuine or spurious)	70	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
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168				
	Late or inadequate response to ACAS warning	349				
	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 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 omitted	169				
	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				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	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 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				
	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	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 constraints 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 separation	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.)	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				
	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 of the system / product compliance with requirements - STCA System	351				
55 ER31B24	TCAS RA events (genuine or spurious)	70	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
	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				
	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 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 omitted	169				
	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				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations	
	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 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					
	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	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 constraints 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 separation	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.)	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					
	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 of the system / product compliance with requirements - STCA System	351					
56	ER31B111	Adverse weather / poor visibility conditions / darkness	6	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 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 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 omitted	169				
		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				
		Altimeter setting error	274				
		Lack of adherence to SOP for take-off procedure in terms of altimeter callibration.	294				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	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				
	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	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 constraints 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 separation	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.)	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				
	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 of the system / product compliance with requirements - STCA System	351				
57	ER31B112	6	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
	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 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 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 omitted	169				
	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				
	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				

Code	Identifiable precursors	No.	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 - 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				
	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	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 constraints 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 - MTC 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 separation	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.)	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				
	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 of the system / product compliance with requirements - STCA System	351				
58 ER31B113	Pilot tiredness - Inadequate workload distribution	167	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 pilot requirements definition process and/or training methodology	168				
	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 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 omitted	169				
	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				
	Altimeter setting error	274				
	Lack of adherence to SOP for take-off procedure in terms of altimeter calibration.	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.)	299				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	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				
	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	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 constraints 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 separation	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.)	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				
	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 of the system / product compliance with requirements - STCA System	351				
59 ER31B114	TCAS RA events (genuine or spurious)	70	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 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 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 omitted	169				
	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				
	Altimeter setting error	274				
	Lack of adherence to SOP for take-off procedure in terms of altimeter calibration.	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.)	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				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations	
	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	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 constraints 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 separation	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.)	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					
	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 of the system / product compliance with requirements - STCA System	351					
60	ER31B12	Pilot tiredness - Inadequate workload distribution	167	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 pilot requirements definition process and/or training methodology	168				
		Inappropriate visual avoidance maneuver	318				
		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 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 omitted	169				
		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				
		Altimeter setting error	274				
		Lack of adherence to SOP for take-off procedure in terms of altimeter calibration.	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.)	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				
		Flaws in manufacturer quality control process - FMS subsystem and components (autopilot incl.)	306				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	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 constraints 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 - MTC 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 separation	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.)	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				
	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 of the system / product compliance with requirements - STCA System	351				
61 ER31C3	not identifiable 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 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 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 omitted	169				
	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				
	Altimeter setting error	274				
	Lack of adherence to SOP for take-off procedure in terms of altimeter calibration.	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.)	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				
	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				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of 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 procedures	326				
	Lack of adherence of airlines to time constraints 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 - MTCO 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 separation	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.)	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				
	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 of the system / product compliance with requirements - STCA System	351				

	Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
ESD 19	Code	Identifiable precursors		Technology	Human	Organisation	System of Organisations
I		Unstable Approach	unique numbers				
1	AL19B111	Lack of adherence to SOP in terms of approach and landing	245		15; 16; 17; 20; 23; 24; 25	26; 27; 32; 34; 35; 36; 38; 39;	50; 51; 54; 55; 58; 59; 61; 62;
		Pilot tiredness - Inadequate workload distribution	167				
		Flaws in pilot requirements definition process and/or training methodology	168				
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;
		Pilot tiredness - Inadequate workload distribution	167				
		Flaws in pilot requirements definition process and/or training methodology	168				
3	AL19B1122	Lack of adherence to SOP in terms of approach and landing	245		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;
		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				
4	AL19B113	Incorrect use of automation - FMS	269		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;
		Pilot tiredness - Inadequate workload distribution	167				
		Flaws in pilot requirements definition process and/or training methodology	168				
		Unintuitive and / or error prone system manual - FMS	494				
5	AL19B121	Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of ILS on descent path	248		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
		Adverse weather / poor visibility conditions / darkness	6				
6	AL19B122	Convective weather / turbulence / windshear or crosswind conditions during take-off	32		16; 18; 19; 20; 21; 23;	26; 31; 34; 35; 36; 39;	48; 50; 51; 54; 55; 58; 59; 60; 61; 62;
		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.	249				
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; 54; 55; 58; 59; 60; 61; 62;
		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.	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				
II		Flight crew fails to initiate and execute missed approach					
8	AL19B211	Pilot tiredness - Inadequate workload distribution	167		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
		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				
		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 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 in the 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				
9	AL19B212	Flaws in pilot requirements definition process and/or training methodology	168				
		Pilot tiredness - Inadequate workload distribution	167				
		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 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 in the 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				

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			
		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 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 in the 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			
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; 40; 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	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 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 in the 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			
III		Flight crew fails to maintain control				
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; 40; 41; 42;	47; 48; 50; 51; 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
		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 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 in the 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			
		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; 40; 41; 42;	47; 48; 50; 51; 52; 53; 54; 55; 56; 57; 58; 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	151			
		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			
		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 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 in the 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			
		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			
14	AL19B33	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	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 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 in the 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			
		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			
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	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 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 in the 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			
		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			
IV		Structural failure				
16	AL19B41	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358	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
		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 - Landing gear components.	377			
		Flaws in manufacturer quality control process - Landing gear components.	376			
		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 STAR (high fix-crossing-altitudes, ...) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions, ...)	413			
		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			
		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 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 in the 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			
		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			
		Lack of adherence to emergency procedures	448			
		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			
17	AL19B42	Hard landing	47	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 adherence to AFM limitations for landing	251			
		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 STAR (high fix-crossing-altitudes, ...) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions, ...)	413			
		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			
		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 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 in the 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			
		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			
		Lack of adherence to emergency procedures	448			
		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			
V		Flight crew fail to maintain control				
18	AL19B51	Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown	49	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
		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 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 in the 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			
		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				
		Lack of adherence to emergency procedures	448				
		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				
		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 STAR (high fix-crossing-altitudes, ...) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions, ...)	413				
		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				
		Inadequate certification process and / or flaws in methodology concerning verification 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				
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150				
		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				
19	AL19B52	Crew is incapable in result of shock related to hard landing	43	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
		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				
		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 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 in the 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				
		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				
		Lack of adherence to emergency procedures	448				
		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				
		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 STAR (high fix-crossing-altitudes, ...) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions, ...)	413				
		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				
		Inadequate certification process and / or flaws in methodology concerning verification 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				
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150				
		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				
20	AL19B53	Lack of adherence to emergency procedures	448	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
		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				

		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 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 in the 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				
		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				
		Lack of adherence to emergency procedures	448				
		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				
		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 STAR (high fix-crossing-altitudes, ...) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions, ...)	413				
		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				
		Inadequate certification process and / or flaws in methodology concerning verification 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				
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150				
		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				
21	AL19B54	Pilot tiredness - Inadequate workload distribution	167	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
		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				
		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 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 in the 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				
		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				
		Lack of adherence to emergency procedures	448				
		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				
		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 STAR (high fix-crossing-altitudes, ...) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions, ...)	413				
		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				
		Inadequate certification process and / or flaws in methodology concerning verification 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				

	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150			
	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	203			
	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 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 in the 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			
	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			
	Lack of adherence to emergency procedures	448			
	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			
23	AL19B62	Hard landing	47	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
	System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)	15			
	Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown	49			
	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149			
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150			
	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 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 in the 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			
	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			
	Lack of adherence to emergency procedures	448			
	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			
24	AL19B63	Failure to arm ground-spoilers	177	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
	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	263			
		Lack of adherence to the main CRM rules	264			
		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 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 in the 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			
		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			
		Lack of adherence to emergency procedures	448			
		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			
VII		Flight crew fail to maintain control				
25	AL19B71	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; 40; 42;	47; 48; 50; 51; 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
		Go-around attempt after thrust reversers deployment	193			
		AOA prevents missed approach	14			
		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 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 in the 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			
26	AL19B72	Pilot tiredness - Inadequate workload distribution	167	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
		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 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 in the 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			
27	AL19B73	Pilot tiredness - Inadequate workload distribution	167	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
		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 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 in the 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			

		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 in the 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			
28	AL19B74	Pilot tiredness - Inadequate workload distribution	167	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
		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 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 in the 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			
VIII		Insufficient fuel available for next approach				
29	AL19B811	Continued unstabilized approach (failure to comply with go-around criteria and policy)	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; 42;	47; 48; 50; 51; 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63
		Lack of adherence to AIR OPS normal procedures in terms of missed approach execution procedure	250			
		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			
		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 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 in the 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	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			
		Lack of adherence to emergency procedures	448			
		Go-around attempt after thrust reversers deployment	193			
30	AL19B8121	Pilot tiredness - Inadequate workload distribution	167	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
		Flaws in pilot requirements definition process and/or training methodology	168			
		Error in calculation of necessary amount of fuel	243			
		Lack of adherence to SOP in terms of necessary amount of fuel	254			
		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 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 in the 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	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				
		Lack of adherence to emergency procedures	448				
		Go-around attempt after thrust reversers deployment	193				
31	AL19B8122	Convective weather encounter	18	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	
		Missed approach execution necessary after prolonged flight due to e. g. extreme weather	44				
		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 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 in the 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	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				
		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; 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	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				
		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 in the 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	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				
		Lack of adherence to emergency procedures	448				
		Go-around attempt after thrust reversers deployment	193				
ESD 23	Code	Identifiable precursors		Technology	Human	Organisation	System of Organisations
		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 locations (e.g. mountains).	225				
		Flight crew fails to detect windshear					
1	AL23B111	Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.	355	16; 23; 25	26; 36; 37; 39;	48; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63	
		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 locations (e.g. mountains).	225				
2	AL23B112	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149	16; 23; 25	26; 36; 37; 39;	48; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63	
		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 - LLWAS system	356				
		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 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; 59; 60; 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 alerting of flight crew on windshear appeared	214			
		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 locations (e.g. mountains).	225			
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			
		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; 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 - PWS system	253			
		Flaws in manufacturer quality control process - PWS system components	298			
		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 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; 58; 59; 60; 61; 62; 63
		Flaws in pilot requirements definition process and/or training methodology	168			
		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 locations (e.g. mountains).	225			
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; 58; 59; 60; 61; 62; 63
		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 locations (e.g. mountains).	225			
		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 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	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	253			
		Flaws in manufacturer quality control process - PWS system components	298			
		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.	355			
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - LLWAS system	356			
8	AL23B221	Convective weather / turbulence / windshear encounter conditions during landing	65	16; 23; 25	26; 36; 37; 39;	48; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
		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 locations (e.g. mountains).	225			
		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 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	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	253			
		Flaws in manufacturer quality control process - PWS system components	298			
		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.	355			
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - LLWAS system	356			
9	AL23B222	Pilot tiredness - Inadequate workload distribution	167		16; 23; 25	26; 36; 37; 39; 48; 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 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 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	137			
		Flaws in traffic controller requirements definition process and/or training methodology	145			
		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	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	253			
		Flaws in manufacturer quality control process - PWS system components	298			
		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.	355			
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - LLWAS system	356			
III		Structural failure				
10	AL23B31	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149	7;	16; 23; 25	26; 36; 37; 39; 48; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
		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			
		Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly	116			
		Hard landing	47			
		Bounced landing	118			
		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			
		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 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	137			
		Flaws in traffic controller requirements definition process and/or training methodology	145			
		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	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	253			
		Flaws in manufacturer quality control process - PWS system components	298			
		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.	355			
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - LLWAS system	356			
		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				
11	AL23B32	Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly	116	7;	16; 23; 25	26; 36; 37; 39;	48; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
		Lack of adherence to AFM limitations for landing	251				
		Hard landing	47				
		Bounced landing	118				
		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				
		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 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	137				
		Flaws in traffic controller requirements definition process and/or training methodology	145				
		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	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	253				
		Flaws in manufacturer quality control process - PWS system components	298				
		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.	355				
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - LLWAS system	356				
		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				
IV		Flight crew fails to maintain control					
12	AL23B41	not identifiable at that level		7;	16; 23; 25	26; 36; 37; 39;	48; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
		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 locations (e.g. mountains).	225				
		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 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	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	253				
		Flaws in manufacturer quality control process - PWS system components	298				
		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.	355				
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - LLWAS system	356				
		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 of applicable limit(s), either intentionally or unknowingly	116				
		Hard landing	47				
		Bounced landing	118				
		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				
		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				

		Inadequate certification process and / or flaws in methodology concerning verification 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				
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150				
		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				
13	AL23B42	Pilot tiredness - Inadequate workload distribution	167	7;	16; 23; 25	26; 36; 37; 39;	48; 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 emergency procedures	448				
		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 locations (e.g. mountains).	225				
		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 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	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	253				
		Flaws in manufacturer quality control process - PWS system components	298				
		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.	355				
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - LLWAS system	356				
		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 of applicable limit(s), either intentionally or unknowingly	116				
		Hard landing	47				
		Bounced landing	118				
		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				
		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				
		Inadequate certification process and / or flaws in methodology concerning verification 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				
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150				
		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				
14	AL23B43	Pilot tiredness - Inadequate workload distribution	167	7;	16; 23; 25	26; 36; 37; 39;	48; 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 emergency procedures	448				
		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 locations (e.g. mountains).	225				
		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 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	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	253				
		Flaws in manufacturer quality control process - PWS system components	298				
		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.	355				
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - LLWAS system	356				
		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 of applicable limit(s), either intentionally or unknowingly	116				
		Hard landing	47				
		Bounced landing	118				
		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				
		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				
		Inadequate certification process and / or flaws in methodology concerning verification 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				
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150				
		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				
15	AL23B44	Pilot tiredness - Inadequate workload distribution	167	7;	16; 23; 25	26; 36; 37; 39;	48; 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 emergency procedures	448				
		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 locations (e.g. mountains).	225				
		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 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	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	253				
		Flaws in manufacturer quality control process - PWS system components	298				
		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.	355				
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - LLWAS system	356				
		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 of applicable limit(s), either intentionally or unknowingly	116				
		Hard landing	47				
		Bounced landing	118				
		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				
		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				
		Inadequate certification process and / or flaws in methodology concerning verification 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				
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150				
		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				
	V	Failure to achieve maximum braking					
16	AL23B51	Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate	45		16; 23; 24; 25	26; 36; 37; 39;	48; 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				
	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				
	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 STAR (high fix-crossing-altitudes, ...) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions, ...)	413				
	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 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	137				
	Flaws in traffic controller requirements definition process and/or training methodology	145				
	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	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	253				
	Flaws in manufacturer quality control process - PWS system components	298				
	Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.	355				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - LLWAS system	356				
	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				
17	AL23B52	Hard landing	47	7; 9;	16; 23; 24; 25	26; 36; 37; 39; 48; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
		System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)	15			
		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149			
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150			
		Severe structural failure of aircraft or / and its critical systems resulted from design load exceeding during touchdown	49			
		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 STAR (high fix-crossing-altitudes, ...) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions, ...)	413			
		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 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	137			
		Flaws in traffic controller requirements definition process and/or training methodology	145			
		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	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	253			
		Flaws in manufacturer quality control process - PWS system components	298			
		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.	355			

		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - LLWAS system	356				
		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	177	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	263				
		Lack of adherence to the main CRM rules	264				
		Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly	116				
		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 STAR (high fix-crossing-altitudes, ...) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions, ...)	413				
		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 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	137				
		Flaws in traffic controller requirements definition process and/or training methodology	145				
		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	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	253				
		Flaws in manufacturer quality control process - PWS system components	298				
		Lack of adherence to the current technology standards in terms of flight safety supporting systems. Lack of LLWAS System.	355				
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - LLWAS system	356				
		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				
ESD 25	Code	Identifiable precursors		Technology	Human	Organisation	System of Organisations
		Aircraft handling by crew during flare inappropriate					
1	AL25B11	Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly	116	7;	13; 14; 18; 25	31; 41; 42;	48; 50; 51; 54; 55; 58; 59; 60; 61; 62;
		Convective weather / turbulence / windshear or crosswind conditions during take-off	32				
		Tailwind component above limit	417				
		Pilot tiredness - Inadequate workload distribution	167				
		Flaws in pilot requirements definition process and/or training methodology	168				
		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 of applicable limit(s), either intentionally or unknowingly	116				
		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				
		Late deceleration and configuration set-up for approach and landing	414				
		Unstabilized final approach (high, fast, steep, ...)	416				
		Long / floating flare	426				
		Convective weather / turbulence / windshear or crosswind conditions during take-off	32				
		Lack of adherence to SOP in terms of approach and landing	245				
		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151				
3	AL25B13	Pilot tiredness - Inadequate workload distribution	167	7;	13; 25	41;	48; 50; 51; 54; 55; 58; 59; 60; 61; 62;
		Flaws in pilot requirements definition process and/or training methodology	168				
		Lack of adherence to SOP in terms of approach and landing	245				

4	AL25B14	Pilot tiredness - Inadequate workload distribution	167		25	41;	48; 50; 51; 54; 55; 58; 59; 60; 61; 62;		
		Flaws in pilot requirements definition process and/or training methodology	168						
		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 of applicable limit(s), either intentionally or unknowingly	116						
II		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	118						
		Inadequate certification process and / or flaws in methodology concerning verification 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						
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150						
		Flaws in aircraft system maintenance process definition - Landing gear components.	377						
		Flaws in manufacturer quality control process - Landing gear components.	376						
		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 of applicable limit(s), either intentionally or unknowingly	116						
		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, vectors, altitude or speed restrictions, ...)	413						
		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 or / and passive contribution to the PF duties	151						
		6	AL25B22	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	118				
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 of applicable limit(s), either intentionally or unknowingly	116								
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, vectors, altitude or speed restrictions, ...)	413								
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 or / and passive contribution to the PF duties	151								
III		Flight crew fails to maintain control							
7	AL25B31	none		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 of applicable limit(s), either intentionally or unknowingly	116						
		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, vectors, altitude or speed restrictions, ...)	413						
		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 or / and passive contribution to the PF duties	151						
		Hard landing	47						
		Bounced landing	118						
		Inadequate certification process and / or flaws in methodology concerning verification 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				
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150				
	Flaws in aircraft system maintenance process definition - Landing gear components.	377				
	Flaws in manufacturer quality control process - Landing gear components.	376				
8	AL25B32	Pilot tiredness - Inadequate workload distribution	167	7;	13; 14; 15; 18; 25	31; 38; 41; 42; 48; 50; 51; 54; 55; 58; 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 of applicable limit(s), either intentionally or unknowingly	116				
	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, vectors, altitude or speed restrictions, ...)	413				
	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 or / and passive contribution to the PF duties	151				
	Hard landing	47				
	Bounced landing	118				
	Inadequate certification process and / or flaws in methodology concerning verification 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				
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150				
	Flaws in aircraft system maintenance process definition - Landing gear components.	377				
	Flaws in manufacturer quality control process - Landing gear components.	376				
9	AL25B33	Pilot tiredness - Inadequate workload distribution	167	7;	13; 14; 15; 18; 25	31; 38; 41; 42; 48; 50; 51; 54; 55; 58; 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 of applicable limit(s), either intentionally or unknowingly	116				
	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, vectors, altitude or speed restrictions, ...)	413				
	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 or / and passive contribution to the PF duties	151				
	Hard landing	47				
	Bounced landing	118				
	Inadequate certification process and / or flaws in methodology concerning verification 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				
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150				
	Flaws in aircraft system maintenance process definition - Landing gear components.	377				
	Flaws in manufacturer quality control process - Landing gear components.	376				
10	AL25B34	Pilot tiredness - Inadequate workload distribution	167	7;	13; 14; 15; 18; 25	31; 38; 41; 42; 48; 50; 51; 54; 55; 58; 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 of applicable limit(s), either intentionally or unknowingly	116				
	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, vectors, altitude or speed restrictions, ...)	413				
	Late deceleration and configuration set-up for approach and landing	414				

ESD 26 Code	Identifiable precursors	Technology	Human	Organisation	System of Organisations
	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				
	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.				
ESD 26 Code	Identifiable precursors	Technology	Human	Organisation	System of Organisations
I	Aircraft handling by flight crew during landing roll inappropriate				
1 AL26B11	Temporary loss of directional control during rollout		24; 25		48; 50; 51; 54; 55; 58; 59; 60; 61; 62;
	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				
	Touchdown off centerline				
	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				
2 AL26B12	Failure to arm ground-spoilers		24; 25	28; 29; 30; 40;	50; 51; 54; 55; 58; 59; 60; 61; 62;
	Inappropriate selection of autobrake mode for given runway length and condition				
	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				
	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				
3 AL26B13	Lack of adherence to SOP in terms of approach and landing		24;	30; 40;	50; 51; 54; 55; 58; 59; 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				
4 AL26B14	Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly				48; 50; 51; 54; 55; 58; 59; 60; 61; 62;
	Convective weather encounter				
	Adverse weather / poor visibility conditions / darkness				
II	Flight crew fails to maintain control				
5 AL26B21	none		24; 25	28; 29; 30; 40;	48; 50; 51; 54; 55; 58; 59; 60; 61; 62;
	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				
	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	151			
6 AL26B22	Pilot tiredness - Inadequate workload distribution	167	24; 25	28; 29; 30; 40;	48; 50; 51; 54; 55; 58; 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 of applicable limit(s), either intentionally or unknowingly	116			
	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 STAR (high fix-crossing-altitudes, ...) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions, ...)	413			
	Late deceleration and configuration set-up for approach and landing	414			
	Failure to remember / assess crosswind component limit for prevailing runway condition	418			
	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			
	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			
	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151			
7 AL26B23	Pilot tiredness - Inadequate workload distribution	167	24; 25	28; 29; 30; 40;	48; 50; 51; 54; 55; 58; 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 of applicable limit(s), either intentionally or unknowingly	116			
	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 STAR (high fix-crossing-altitudes, ...) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions, ...)	413			
	Late deceleration and configuration set-up for approach and landing	414			
	Failure to remember / assess crosswind component limit for prevailing runway condition	418			
	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			
	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			
	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151			
8 AL26B24	Pilot tiredness - Inadequate workload distribution	167	24; 25	28; 29; 30; 40;	48; 50; 51; 54; 55; 58; 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 of applicable limit(s), either intentionally or unknowingly	116			
	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 STAR (high fix-crossing-altitudes, ...) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions, ...)	413			
	Late deceleration and configuration set-up for approach and landing	414			
	Failure to remember / assess crosswind component limit for prevailing runway condition	418			
	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			
	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			
		Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151			
III		Failure to achieve maximum braking				
9	AL26B31	Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate	45	24; 25	28; 29; 30; 40;	48; 50; 51; 52; 53; 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			
		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			
		Convective weather encounter	18			
		Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly	116			
		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 STAR (high fix-crossing-altitudes, ...) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions, ...)	413			
		Late deceleration and configuration set-up for approach and landing	414			
		Failure to remember / assess crosswind component limit for prevailing runway condition	418			
		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			
		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			
		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 emergency procedures	448			
10	AL26B32	System failures that may affect braking devices (ground spoilers, brakes / autobrake, thrust reversers)	15	7; 9;	24; 25	28; 29; 30; 40;
		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149			48; 50; 51; 54; 55; 58; 59; 60; 61; 62;
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150			
		Convective weather encounter	18			
		Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly	116			
		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 STAR (high fix-crossing-altitudes, ...) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions, ...)	413			
		Late deceleration and configuration set-up for approach and landing	414			
		Failure to remember / assess crosswind component limit for prevailing runway condition	418			
		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			
		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			
		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 emergency procedures	448			
11	AL26B33	Failure to arm ground-spoilers	177	24; 25	28; 29; 30; 40;	48; 50; 51; 54; 55; 58; 59; 60; 61; 62;
		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			
		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				
		Flaws in CRM training procedures	263				
		Lack of adherence to the main CRM rules	264				
		Convective weather encounter	18				
		Tailwind or crosswind landing with tailwind and/or crosswind component(s) in excess of applicable limit(s), either intentionally or unknowingly	116				
		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 STAR (high fix-crossing-altitudes, ...) or challenging ATC instructions (late descent, vectors, altitude or speed restrictions, ...)	413				
		Late deceleration and configuration set-up for approach and landing	414				
		Failure to remember / assess crosswind component limit for prevailing runway condition	418				
		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				
		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				
		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 emergency procedures	448				
ESD 27	Code	Identifiable precursors		Technology	Human	Organisation	System of Organisations
	I	Aircraft directional control related systems failure					
1	AL27B111	System failure affecting the operation of primary instruments / displays or standby instruments	26	7;	23;	40;	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				
		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				
2	AL27B112	System failure affecting the operation of primary instruments / displays or standby instruments	26	7;	23;		50; 51; 54; 55; 58; 59; 60; 61; 62;
		Flaws in manufacturer quality control process - Landing gear components.	376				
		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149				
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150				
3	AL27B113	Tire burst	80	7;	23;		49; 50; 51; 52; 53; 54; 55; 58; 59; 60; 61; 62; 63
		Contaminated Runway	39				
		Bird strike	34				
		Wildlife incursion	5				
		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216				
		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162				
		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				
4	AL27B114	Flaws in aircraft system maintenance process definition - Landing gear components.	377	7;	23;		50; 51; 54; 55; 58; 59; 60; 61; 62;
		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149				
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150				
5	AL27B115	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358	7;			50; 51; 54; 55; 58; 59; 60; 61; 62;
6	AL27B121	System failure affecting the operation of primary instruments / displays or standby instruments	26	7;			50; 51; 54; 55; 58; 59; 60; 61; 62;
		Flaws in aircraft system maintenance process definition - Landing gear components.	377				
		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149				
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150				
		Tire burst	80				
7	AL27B122	Tire burst	80	7;			49; 50; 51; 52; 53; 54; 55; 58; 59; 60; 61; 62; 63
		Contaminated Runway	39				
		Bird strike	34				

		Wildlife incursion	5			
		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401			
		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216			
		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162			
		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			
8	AL27B123	Flaws in aircraft system maintenance process definition - Landing gear components.	377	7;		50; 51; 54; 55; 58; 59; 60; 61; 62;
		Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149			
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150			
9	AL27B124	Tire burst	80	7;		50; 51; 54; 55; 58; 59; 60; 61; 62;
		Contaminated Runway	39			
		System failure affecting the operation of primary instruments / displays or standby instruments	26			
		Wildlife incursion	5			
		Flaws in aircraft system maintenance process definition - Landing gear components.	377			
		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 SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401			
		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216			
		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			
10	AL27B125	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358	7;		50; 51; 54; 55; 58; 59; 60; 61; 62;
II		Flight crew fails to maintain control				
11	AL27B21	not identifiable at the moment		7;	23;	40;
		Tire burst	80			49; 50; 51; 52; 53; 54; 55; 58; 59; 60; 61; 62; 63
		Contaminated Runway	39			
		Bird strike	34			
		System failure affecting the operation of primary instruments / displays or standby instruments	26			
		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 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 - Landing gear components	358			
		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401			
		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216			
		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162			
		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			
12	AL27B22	Pilot tiredness - Inadequate workload distribution	167	7;	23;	40;
		Flaws in pilot requirements definition process and/or training methodology	168			49; 50; 51; 52; 53; 54; 55; 58; 59; 60; 61; 62; 63
		Lack of adherence to emergency procedures	448			
		Tire burst	80			
		Contaminated Runway	39			
		Bird strike	34			
		System failure affecting the operation of primary instruments / displays or standby instruments	26			
		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 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 - Landing gear components	358			
		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401			

		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216				
		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162				
		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				
13	AL27B23	Pilot tiredness - Inadequate workload distribution	167	7;	23;	40;	49; 50; 51; 52; 53; 54; 55; 58; 59; 60; 61; 62; 63
		Flaws in pilot requirements definition process and/or training methodology	168				
		Lack of adherence to emergency procedures	448				
		Tire burst	80				
		Contaminated Runway	39				
		Bird strike	34				
		System failure affecting the operation of primary instruments / displays or standby instruments	26				
		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 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 - Landing gear components	358				
		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401				
		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216				
		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162				
		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				
14	AL27B24	Pilot tiredness - Inadequate workload distribution	167	7;	23;	40;	49; 50; 51; 52; 53; 54; 55; 58; 59; 60; 61; 62; 63
		Flaws in pilot requirements definition process and/or training methodology	168				
		Lack of adherence to emergency procedures	448				
		Tire burst	80				
		Contaminated Runway	39				
		Bird strike	34				
		System failure affecting the operation of primary instruments / displays or standby instruments	26				
		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 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 - Landing gear components	358				
		Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401				
		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216				
		Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162				
		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				

Code	Identifiable precursors	No.	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 - Hydraulic system components	333					
	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 instruments	26	3;	13; 14; 22;	41; 42;	47; 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					
	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 instruments and systems.	383					
7	TO01B17	System failure affecting the operation of primary instruments / displays or standby instruments	26	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
	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149					
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150					
	Navigation deviation	317					
	Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491					
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492					
	Flaws in manufacturer quality control process - Onboard navigational systems and components.	493					
8	TO01B18	System failure affecting aircraft configuration, controllability and/or flying qualities	25	2;			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					
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - APU systems and / or components	464					
	Flaws in manufacturer quality control process - APU systems and / or components	465					
	Flaws in aircraft system maintenance process definition - APU systems and / or components	466					
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; 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 - Components of Wing control surface system.	288					
	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.	314					
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; 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 - Drag control system components.	381					
	Flaws in aircraft system maintenance process definition - Drag control system components.	379					
	Flaws in manufacturer quality control process - Drag control system components.	378					
11	TO01B111	System failure affecting aircraft configuration, controllability and/or flying qualities	25	7;	23;	26; 29;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63
	Landing gear retraction failure	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 - 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					
12	TO01B112	System failure affecting the operation of primary instruments / displays or standby instruments	26	3; 9;	13; 21;	41;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63
	Engine failure	77					
	Cabin pressure drop as a result of pneumatic system failure	79					
	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149					

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations	
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150					
	Inadequate aircraft de-icing / anti-icing	180					
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Pneumatic system components.	375					
	Flaws in aircraft system maintenance process definition - Pneumatic system components.	374					
	Flaws in manufacturer quality control process - Pneumatic system components.	373					
13	TO01B113	System failure affecting the operation of primary instruments / displays or standby instruments	26		18; 21;	31; 32; 33; 34; 35;	47; 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					
	Inadequate certification process and / or flaws in methodology concerning verification 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 components	391					
14	TO01B114	System failure affecting aircraft configuration, controllability and/or flying qualities	25	4; 6;	22;		50; 51; 54; 55; 58; 59; 60; 61; 62; 63
	System failure affecting the operation of primary instruments / displays or standby instruments	26					
	Other cockpit effects / malfunctions (genuine or spurious) occurring during takeoff roll	98					
	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 - other critical flight instruments and systems.	385					
	Flaws in aircraft system maintenance process definition - other critical flight instruments and systems.	383					
II		Take-off Rejection by Flight Crew					
15	TO01B211	Pilot tiredness - Inadequate workload distribution	167	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
	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 instruments	26					
	Prolonged loss of communications (PLOC) between pilot and controller(s)	53					
	Landing gear retraction failure	63					
	Engine failure	77					
	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 process and/or training methodology	149					
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150					
	Inadequate aircraft de-icing / anti-icing	180					
	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 - 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					
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.	288					
	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					
	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.	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	317					
	Flaws in manufacturer quality control process - Autothrottle system in the engine.	324					

Code	Identifiable precursors	No. SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations	
	Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.	325				
	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 of the system / product compliance with requirements - Landing gear components	358				
	Flaws in aircraft system maintenance process definition - FMS subsystems and 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 components	464				
	Flaws in aircraft system maintenance process definition - APU systems and / or components	466				
	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	476				
	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				
	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				
	Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492				
	Flaws in manufacturer quality control process - Onboard navigational systems and components.	493				
	Inadequate certification process and / or flaws in methodology concerning verification 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 components	391				
	Flaws in aircraft system maintenance process definition - Power supply system components	387				
	Flaws in manufacturer quality control process -Hydraulic system components.	386				
	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 instruments and systems.	383				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Drag control system components.	381				
	Flaws in aircraft system maintenance process definition - Drag control system components.	379				
	Flaws in manufacturer quality control process - Drag control system components.	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 of the system / product compliance with requirements - Pneumatic system components.	375				
	Flaws in aircraft system maintenance process definition - Pneumatic system components.	374				
	Flaws in manufacturer quality control process - Pneumatic system components.	373				
16	TO01B212 Pilot tiredness - Inadequate workload distribution	167	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
	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 instruments	26				
	Prolonged loss of communications (PLOC) between pilot and controller(s)	53				
	Landing gear retraction failure	63				
	Engine failure	77				
	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				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149				
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150				
	Inadequate aircraft de-icing / anti-icing	180				
	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 - 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				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.	288				
	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				
	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.	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	317				
	Flaws in manufacturer quality control process - Autothrottle system in the engine.	324				
	Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.	325				
	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 of the system / product compliance with requirements - Landing gear components	358				
	Flaws in aircraft system maintenance process definition - FMS subsystems and 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 components	464				
	Flaws in aircraft system maintenance process definition - APU systems and / or components	466				
	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 dection system components	475				
	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 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				
	Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492				
	Flaws in manufacturer quality control process - Onboard navigational systems and components.	493				
	Inadequate certification process and / or flaws in methodology concerning verification 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 components	391				
	Flaws in aircraft system maintenance process definition - Power supply system components	387				
	Flaws in manufacturer quality control process -Hydraulic system components.	386				

Code	Identifiable precursors	No. 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 - other critical flight instruments and systems.	385			
	Flaws in aircraft system maintenance process definition - other critical flight instruments and systems.	383			
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Drag control system components.	381			
	Flaws in aircraft system maintenance process definition - Drag control system components.	379			
	Flaws in manufacturer quality control process - Drag control system components.	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 of the system / product compliance with requirements - Pneumatic system components.	375			
	Flaws in aircraft system maintenance process definition - Pneumatic system components.	374			
	Flaws in manufacturer quality control process - Pneumatic system components.	373			
17	TO01B22 not identifiable at that level		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;
	System failure affecting aircraft configuration, controllability and/or flying qualities	25			45; 47; 50; 51; 54; 55;
	System failure affecting the operation of primary instruments / displays or standby instruments	26			56; 57; 58; 59; 60; 61; 62; 63
	Prolonged loss of communications (PLOC) between pilot and controller(s)	53			
	Landing gear retraction failure	63			
	Engine failure	77			
	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 process and/or training methodology	149			
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150			
	Inadequate aircraft de-icing / anti-icing	180			
	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 - 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			
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.	288			
	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			
	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.	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	317			
	Flaws in manufacturer quality control process - Autothrottle system in the engine.	324			
	Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.	325			
	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 of the system / product compliance with requirements - Landing gear components	358			
	Flaws in aircraft system maintenance process definition - FMS subsystems and 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 components	464			
	Flaws in aircraft system maintenance process definition - APU systems and / or components	466			
	Flaws in aircraft system maintenance process definition - Fire detection system components	474			

Code	Identifiable precursors	No.	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 - Fire deection system components	475				
	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 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				
	Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492				
	Flaws in manufacturer quality control process - Onboard navigational systems and components.	493				
	Inadequate certification process and / or flaws in methodology concerning verification 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 components	391				
	Flaws in aircraft system maintenance process definition - Power supply system components	387				
	Flaws in manufacturer quality control process -Hydraulic system components.	386				
	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 instruments and systems.	383				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Drag control system components.	381				
	Flaws in aircraft system maintenance process definition - Drag control system components.	379				
	Flaws in manufacturer quality control process - Drag control system components.	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 of the system / product compliance with requirements - Pneumatic system components.	375				
	Flaws in aircraft system maintenance process definition - Pneumatic system components.	374				
	Flaws in manufacturer quality control process - Pneumatic system components.	373				
III	Failure to Achieve Maximum Braking					
18	TO01B31					
	Convective weather - heavy rain resulted with wet RWY surface	75	1; 2; 3; 4; 5; 6; 7; 8; 9;	11; 13; 14; 15; 18; 19;	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
	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 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				
	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 instruments	26				
	Prolonged loss of communications (PLOC) between pilot and controller(s)	53				
	Landing gear retraction failure	63				
	Engine failure	77				
	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 process and/or training methodology	149				
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150				
	Inadequate aircraft de-icing / anti-icing	180				
	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 - Communication equipment systems and components.	270				

Code	Identifiable precursors	No.	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 - Communication equipment systems and components.	271				
	Flaws in manufacturer quality control process - Communication equipment systems and components.	272				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.	288				
	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				
	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.	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	317				
	Flaws in manufacturer quality control process - Autothrottle system in the engine.	324				
	Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.	325				
	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 of the system / product compliance with requirements - Landing gear components	358				
	Flaws in aircraft system maintenance process definition - FMS subsystems and 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 components	464				
	Flaws in aircraft system maintenance process definition - APU systems and / or components	466				
	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	476				
	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				
	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				
	Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492				
	Flaws in manufacturer quality control process - Onboard navigational systems and components.	493				
	Inadequate certification process and / or flaws in methodology concerning verification 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 components	391				
	Flaws in aircraft system maintenance process definition - Power supply system components	387				
	Flaws in manufacturer quality control process -Hydraulic system components.	386				
	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 instruments and systems.	383				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Drag control system components.	381				
	Flaws in aircraft system maintenance process definition - Drag control system components.	379				
	Flaws in manufacturer quality control process - Drag control system components.	378				
	Flaws in aircraft system maintenance process definition - Landing gear components.	377				
	Flaws in manufacturer quality control process - Landing gear components.	376				

Code	Identifiable precursors	No.	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 - Pneumatic system components.	375				
	Flaws in aircraft system maintenance process definition - Pneumatic system components.	374				
	Flaws in manufacturer quality control process - Pneumatic system components.	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				
19	TO01B32	25	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
	Contaminated Runway	39				
	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 ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216				
	Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake).	366				
	System failure affecting aircraft configuration, controllability and/or flying qualities	25				
	System failure affecting the operation of primary instruments / displays or standby instruments	26				
	Prolonged loss of communications (PLOC) between pilot and controller(s)	53				
	Landing gear retraction failure	63				
	Engine failure	77				
	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 process and/or training methodology	149				
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150				
	Inadequate aircraft de-icing / anti-icing	180				
	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 - 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				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.	288				
	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				
	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.	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	317				
	Flaws in manufacturer quality control process - Autothrottle system in the engine.	324				
	Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.	325				
	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 of the system / product compliance with requirements - Landing gear components	358				
	Flaws in aircraft system maintenance process definition - FMS subsystems and 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 components	464				
	Flaws in aircraft system maintenance process definition - APU systems and / or components	466				
	Flaws in aircraft system maintenance process definition - Fire detection system components	474				

Code	Identifiable precursors	No.	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 - Fire deection system components	475				
	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 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				
	Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492				
	Flaws in manufacturer quality control process - Onboard navigational systems and components.	493				
	Inadequate certification process and / or flaws in methodology concerning verification 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 components	391				
	Flaws in aircraft system maintenance process definition - Power supply system components	387				
	Flaws in manufacturer quality control process -Hydraulic system components.	386				
	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 instruments and systems.	383				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Drag control system components.	381				
	Flaws in aircraft system maintenance process definition - Drag control system components.	379				
	Flaws in manufacturer quality control process - Drag control system components.	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 of the system / product compliance with requirements - Pneumatic system components.	375				
	Flaws in aircraft system maintenance process definition - Pneumatic system components.	374				
	Flaws in manufacturer quality control process - Pneumatic system components.	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				
20	TO01B33					
	Pilot tiredness - Inadequate workload distribution	167	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
	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	25				
	System failure affecting the operation of primary instruments / displays or standby instruments	26				
	Prolonged loss of communications (PLOC) between pilot and controller(s)	53				
	Landing gear retraction failure	63				
	Engine failure	77				
	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 process and/or training methodology	149				
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150				
	Inadequate aircraft de-icing / anti-icing	180				
	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 - 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				

Code	Identifiable precursors	No. SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	Flaws in manufacturer quality control process - Communication equipment systems and components.	272			
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Components of Wing control surface system.	288			
	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			
	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.	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	317			
	Flaws in manufacturer quality control process - Autothrottle system in the engine.	324			
	Flaws in aircraft system maintenance process definition - Autothrottle system in the engine.	325			
	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 of the system / product compliance with requirements - Landing gear components	358			
	Flaws in aircraft system maintenance process definition - FMS subsystems and 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 components	464			
	Flaws in aircraft system maintenance process definition - APU systems and / or components	466			
	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	476			
	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			
	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			
	Flaws in aircraft system maintenance process definition - Onboard navigational systems and components	491			
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Onboard navigational systems and components.	492			
	Flaws in manufacturer quality control process - Onboard navigational systems and components.	493			
	Inadequate certification process and / or flaws in methodology concerning verification 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 components	391			
	Flaws in aircraft system maintenance process definition - Power supply system components	387			
	Flaws in manufacturer quality control process -Hydraulic system components.	386			
	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 instruments and systems.	383			
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Drag control system components.	381			
	Flaws in aircraft system maintenance process definition - Drag control system components.	379			
	Flaws in manufacturer quality control process - Drag control system components.	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 of the system / product compliance with requirements - Pneumatic system components.	375			

Code	Identifiable precursors	No.	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 components.	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 Organisations
	Air Traffic related event					
1	TO02B11111 Convective weather / turbulence / wind shear or crosswind conditions during take-off	32		14; 20; 22;	32; 33; 34; 35; 42;	47; 48; 50; 51; 54; 55; 56; 57; 59; 60; 61; 62; 63
	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	145				
2	TO02B11112 Lack of English proficiency	132		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
	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				
	Pilot tiredness - Inadequate workload distribution	167				
	Flaws in pilot requirements definition process and/or training methodology	168				
3	TO02B11112 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; 55; 56; 57; 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 Rules of the Air - adherence to Controller clearance	296				
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; 56; 57; 59; 60; 61; 62; 63
	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 sufficient separation / clearance	143				
	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 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; 55; 56; 57; 59; 60; 61; 62; 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; 56; 57; 59; 60; 61; 62; 63
	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				
	Flaws in pilot requirements definition process and/or training methodology	168				
	Lack of adherence to Rules of the Air - adherence to Controller clearance	296				
7	TO02B11214 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; 56; 57; 59; 60; 61; 62; 63
	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				
	Takeoff without clearance	157				
	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				
8	TO02B11215 Lack of adherence to SOP for GND movements. Lack of awareness of other traffic movements through listening of ATC communications	140		11; 19; 22; 23;	32; 34; 43; 44	45; 47; 50; 51; 54; 55; 56; 57; 59; 60; 61; 62; 63
	Takeoff without clearance	157				
	Pilot tiredness - Inadequate workload distribution	167				

Code	Identifiable precursors	No. SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations	
	Flaws in pilot requirements definition process and/or training methodology	168				
	Lack of adherence to Rules of the Air - adherence to Controller clearance	296				
9	TO02B11216	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151	19; 22;	32; 34; 43; 44	45; 47; 50; 51; 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 Rules of the Air - adherence to Controller clearance	296				
10	TO02B1122	Flaws in Airspace and Air Traffic planning procedures design process	323	19; 20; 22;	32; 33; 35;	47; 50; 51; 54; 55; 56; 57; 59; 60; 61; 62; 63
	Flaws in airport capacity management process	400				
11	TO02B1123	Pilot tiredness - Inadequate workload distribution	167	11; 19; 23;	32; 34; 43; 44	45; 50; 51; 56; 57; 59; 60; 61; 62; 63
	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 SOP for take-off procedure in terms of time limitation for take-off preparation.	404				
12	TO02B1124	Wildlife incursion	5	11; 22;	43; 44	45; 49; 50; 51; 59; 60; 61; 62; 63
	Bird strike	34				
	Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162				
	Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401				
13	TO02B1125	Convective weather / turbulence / wind shear or crosswind conditions during take-off	32	22;		48; 50; 51; 56; 57; 59; 60; 61; 62; 63
14	TO02B12	Risk of dangerous occurrences appeared during take-off roll	85	22;		50; 59;
II		Flight Crew rejects take-off				
15	TO02B211	Pilot tiredness - Inadequate workload distribution	167	11; 14; 19; 20; 22; 23;	32; 33; 34; 35; 42; 43; 44	45; 47; 48; 49; 50; 51; 54; 55; 56; 57; 59; 60; 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	5				
	Emergency landing	8				
	Convective weather / turbulence / wind shear or crosswind conditions during take-off	32				
	Bird strike	34				
	Risk of dangerous occurrences 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				
	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				
	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. 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 sufficient separation / clearance	143				
	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 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				
	Takeoff without clearance	157				
	Landing without clearance	158				
	Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	160				
	Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162				
	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 integrity monitoring	401				
	Lack of adherence to SOP for take-off procedure in terms of time limitation for take-off preparation.	404				
	Taxiing without clearance	367				
16	TO02B212	Pilot tiredness - Inadequate workload distribution	167	11; 14; 19; 20; 22; 23;	32; 33; 34; 35; 42; 43; 44	45; 47; 48; 49; 50; 51; 54; 55; 56; 57; 59; 60; 61; 62; 63
	Flaws in pilot requirements definition process and/or training methodology	168				

Code	Identifiable precursors	No. SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	Poor application of T/O & RTO procedure, adherence to SOP, criteria for STOP decision	207			
	Late rejected takeoff decision / initiation	368			
	Wildlife incursion	5			
	Emergency landing	8			
	Convective weather / turbulence / windshear or crosswind conditions during take-off	32			
	Bird strike	34			
	Risk of dangerous occurrences 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			
	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			
	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. 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 sufficient separation / clearance	143			
	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 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			
	Takeoff without clearance	157			
	Landing without clearance	158			
	Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	160			
	Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162			
	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 integrity monitoring	401			
	Lack of adherence to SOP for take-off procedure in terms of time limitation for take-off preparation.	404			
	Taxiing without clearance	367			
17 TO02B22	not identifiable at that level		11; 14; 19; 20; 22; 23;	32; 33; 34; 35; 42; 43; 44	45; 47; 48; 49; 50; 51; 54; 55; 56; 57; 59; 60; 61; 62; 63
	Wildlife incursion	5			
	Emergency landing	8			
	Convective weather / turbulence / windshear or crosswind conditions during take-off	32			
	Bird strike	34			
	Risk of dangerous occurrences 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			
	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			
	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. 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 sufficient separation / clearance	143			
	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 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			
	Takeoff without clearance	157			
	Landing without clearance	158			

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	160				
	Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162				
	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 integrity monitoring	401				
	Lack of adherence to SOP for take-off procedure in terms of time limitation for take-off preparation.	404				
	Taxiing without clearance	367				
III	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; 44	45; 47; 48; 49; 50; 51; 54; 55; 56; 57; 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 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				
	Poor application of T/O & RTO procedure, computation of T/O parameters	260				
	Wildlife incursion	5				
	Emergency landing	8				
	Convective weather / turbulence / windshear or crosswind conditions during take-off	32				
	Bird strike	34				
	Risk of dangerous occurrences 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				
	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				
	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. Lack of awareness of own position on the airtaxi and airport topology.	142				
	Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	143				
	Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airtaxi 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 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				
	Takeoff without clearance	157				
	Landing without clearance	158				
	Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	160				
	Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162				
	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 integrity monitoring	401				
	Lack of adherence to SOP for take-off procedure in terms of time limitation for take-off preparation.	404				
	Taxiing without clearance	367				
	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				
19	TO02B32 System failure affecting aircraft configuration, controllability and/or flying qualities	25	7; 9;	11; 14; 19; 20; 22; 23;	32; 33; 34; 35; 42; 43; 44	45; 47; 48; 49; 50; 51; 54; 55; 56; 57; 59; 60; 61; 62; 63

Code	Identifiable precursors	No. SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	Contaminated Runway	39			
	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 ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216			
	Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake).	366			
	Wildlife incursion	5			
	Emergency landing	8			
	Convective weather / turbulence / windshear or crosswind conditions during take-off	32			
	Bird strike	34			
	Risk of dangerous occurrences 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			
	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			
	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. Lack of awareness of own position on the airtaxi and airport topology.	142			
	Lack of adherence to SOP for GND movements. Lack of awareness in terms of sufficient separation / clearance	143			
	Lack of adherence to SOP for GND movements. Lack of awareness in terms of current situation on the airtaxi 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 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			
	Takeoff without clearance	157			
	Landing without clearance	158			
	Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	160			
	Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162			
	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 integrity monitoring	401			
	Lack of adherence to SOP for take-off procedure in terms of time limitation for take-off preparation.	404			
	Taxiing without clearance	367			
	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			
20	TO02B33				
	Pilot tiredness - Inadequate workload distribution	167	11; 14; 19; 20; 22; 23;	28; 29; 30; 32; 33; 34; 35; 42; 43; 44	45; 47; 48; 49; 50; 51; 54; 55; 56; 57; 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	5			
	Emergency landing	8			
	Convective weather / turbulence / windshear or crosswind conditions during take-off	32			
	Bird strike	34			
	Risk of dangerous occurrences 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			
	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			
	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. Lack of awareness of own position on the airtaxi and airport topology.	142			

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 separation / clearance	143				
	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 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				
	Takeoff without clearance	157				
	Landing without clearance	158				
	Lack of adherence to Rules of the Air - runway used for alternating take-offs and landings	160				
	Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162				
	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 integrity monitoring	401				
	Lack of adherence to SOP for take-off procedure in terms of time limitation for take-off preparation.	404				
	Taxiing without clearance	367				
	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				
ESD 3 Code	identifiable precursors	No.	Technology	Human	Organisation	System of Organisations
I	Inappropriate handling by flight crew					
1	TO03B111	Lack of adherence to the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151	9;	22;	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			
2	TO03B112	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; 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 AFM limitations for Take-off	202			
		Failure to remember / assess crosswind component limit for prevailing runway condition	418			
3	TO03B12	Convective weather / turbulence / windshear or crosswind conditions during take-off	32		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 RWY surface friction rate	45			
		Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling	200			
		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			
II	Take-off Rejection					
4	TO03B211	Pilot tiredness - Inadequate workload distribution	167	9;	22;	48; 50; 51; 52; 53; 54; 55; 58; 59; 60; 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			
		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	45			
		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, use of MET / ATIS information, aircraft 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 surface condition. Snow / ice presence / or runway surface friction rate below minimum	203			
		Failure to remember / assess crosswind component limit for prevailing runway condition	418			
5	TO03B212	Pilot tiredness - Inadequate workload distribution	167	9;	22;	48; 50; 51; 52; 53; 54; 55; 58; 59; 60; 61; 62; 63

Code	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, adherence to SOP, criteria for STOP decision	207				
	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 RWY surface friction rate	45				
	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, use of MET / ATIS information, aircraft 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 surface condition. Snow / ice presence / or runway surface friction rate below minimum	203				
	Failure to remember / assess crosswind component limit for prevailing runway condition	418				
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				
	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 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, use of MET / ATIS information, aircraft 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 surface condition. Snow / ice presence / or runway surface friction rate below minimum	203				
	Failure to remember / assess crosswind component limit for prevailing runway condition	418				
III	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 RWY surface friction rate	45				
	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, use of MET / ATIS information, aircraft 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 surface condition. Snow / ice presence / or runway surface friction rate below minimum	203				
	Failure to remember / assess crosswind component limit for prevailing runway condition	418				
	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				
8 TO03B32	Pilot tiredness - Inadequate workload distribution	167	9;	22;		48; 50; 51; 52; 53; 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				
	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	45				
	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, use of MET / ATIS information, aircraft 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 surface condition. Snow / ice presence / or runway surface friction rate below minimum	203				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	Failure to remember / assess crosswind component limit for prevailing runway condition	418				
	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; 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				
	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	45				
	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, use of MET / ATIS information, aircraft 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 surface condition. Snow / ice presence / or runway surface friction rate below minimum	203				
	Failure to remember / assess crosswind component limit for prevailing runway condition	418				
	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				
10	TO03B34	Pilot tiredness - Inadequate workload distribution	167	9;	22;	48; 50; 51; 52; 53; 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				
	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	45				
	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, use of MET / ATIS information, aircraft 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 surface condition. Snow / ice presence / or runway surface friction rate below minimum	203				
	Failure to remember / assess crosswind component limit for prevailing runway condition	418				
	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				
IV		Failure to Achieve Maximum Braking				
11	TO03B41	Convective weather - heavy rain resulted with wet RWY surface	75	9;	22;	48; 50; 51; 52; 53; 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				
	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				
	Poor application of T/O & RTO procedure, computation of T/O parameters	260				
	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	45				
	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, use of MET / ATIS information, aircraft handling	200				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	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	203				
	Failure to remember / assess crosswind component limit for prevailing runway condition	418				
	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				
	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				
	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 ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216				
	Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake).	366				
	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	45				
	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, use of MET / ATIS information, aircraft 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 surface condition. Snow / ice presence / or runway surface friction rate below minimum	203				
	Failure to remember / assess crosswind component limit for prevailing runway condition	418				
	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				
	Poor application of T/O & RTO procedure, aircraft handling	388				
13 TO03B43	Pilot tiredness - Inadequate workload distribution	167	9;	22;	28; 29; 30;	48; 50; 51; 52; 53; 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	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	45				
	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, use of MET / ATIS information, aircraft 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 surface condition. Snow / ice presence / or runway surface friction rate below minimum	203				
	Failure to remember / assess crosswind component limit for prevailing runway condition	418				
	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				
	Poor application of T/O & RTO procedure, aircraft handling	388				
V	Failure to maintain control					

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations	
14	TO03B51	not identifiable at the moment		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 RWY surface friction rate	45				
		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, use of MET / ATIS information, aircraft 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 surface condition. Snow / ice presence / or runway surface friction rate below minimum	203				
		Failure to remember / assess crosswind component limit for prevailing runway condition	418				
15	TO03B52	Pilot tiredness - Inadequate workload distribution	167	9;	22;	48; 50; 51; 52; 53; 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				
		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	45				
		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, use of MET / ATIS information, aircraft 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 surface condition. Snow / ice presence / or runway surface friction rate below minimum	203				
		Failure to remember / assess crosswind component limit for prevailing runway condition	418				
16	TO03B53	Pilot tiredness - Inadequate workload distribution	167	9;	22;	48; 50; 51; 52; 53; 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				
		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	45				
		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, use of MET / ATIS information, aircraft 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 surface condition. Snow / ice presence / or runway surface friction rate below minimum	203				
		Failure to remember / assess crosswind component limit for prevailing runway condition	418				
17	TO03B54	Pilot tiredness - Inadequate workload distribution	167	9;	22;	48; 50; 51; 52; 53; 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				
		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	45				
		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, use of MET / ATIS information, aircraft 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 surface condition. Snow / ice presence / or runway surface friction rate below minimum	203				
		Failure to remember / assess crosswind component limit for prevailing runway condition	418				
ESD 4	Code	identifiable precursors	No.	Technology	Human	Organisation	System of Organisations
I		Directional control systems failure					

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; 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 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				
2	TO04B112	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 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; 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 - marshalling/rolling/taxiing control related system and components (incl. brake)	196				
		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				
4	TO04B122	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 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				
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 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				
II		Take-off rejection					
6	TO04B211	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, failure recognition and preparedness	209				
		System failure affecting aircraft configuration, controllability and/or flying qualities	25				
		Tire burst	80				
		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 - 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.	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				

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	25					
	Tire burst	80					
	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 - 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.	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					
	8	TO04B22 not identifiable at that level		7;			50; 51; 54; 55; 58; 59; 60; 61; 62; 63
System failure affecting aircraft configuration, controllability and/or flying qualities		25					
Tire burst		80					
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 - 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.		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					
III		9 TO04B31 Failure to maintain control (take-off rejected)		7;			50; 51; 54; 55; 58; 59; 60; 61; 62; 63
		not identifiable at the moment					
		System failure affecting aircraft configuration, controllability and/or flying qualities	25				
	Tire burst	80					
	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 - 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.	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					
	Pilot tiredness - Inadequate workload distribution	167					
	Flaws in pilot requirements definition process and/or training methodology	168					
Poor application of T/O & RTO procedure, failure recognition and preparedness	209						
10	TO04B32 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, 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 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 - 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					

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	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 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				
	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	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, 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 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 - 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.	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				
	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				
12	TO04B34	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, 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 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 - 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.	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				
	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				
IV		Failure to Achieve Maximum Braking (V<V1)				
13	TO04B41	Convective weather - heavy rain resulted with wet RWY surface	75	7;		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				
	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				
	Poor application of T/O & RTO procedure, computation of T/O parameters	260				
	System failure affecting aircraft configuration, controllability and/or flying qualities	25				
	Tire burst	80				
	Flaws in maintenance technician / airworthiness specialist requirements definition process and/or training methodology	149				
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150				

Code	Identifiable precursors	No.	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 - 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.	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				
	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	System failure affecting aircraft configuration, controllability and/or flying qualities	25	7; 9;		50; 51; 54; 55; 58; 59; 60; 61; 62; 63
	Contaminated Runway	39				
	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 ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216				
	Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake).	366				
	System failure affecting aircraft configuration, controllability and/or flying qualities	25				
	Tire burst	80				
	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 - 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.	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				
	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				
15	TO04B43	Pilot tiredness - Inadequate workload distribution	167	7;	28; 29; 30;	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	199				
	System failure affecting aircraft configuration, controllability and/or flying qualities	25				
	Tire burst	80				
	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 - 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.	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				
	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				

Code	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, aircraft handling	388				
V	Failure to Maintain control (take-off continued)					
16	TO04B51		7;			50; 51; 54; 55; 58; 59; 60; 61; 62; 63
	not identifiable at that level					
	System failure affecting aircraft configuration, controllability and/or flying qualities	25				
	Tire burst	80				
	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 - 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.	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				
17	TO04B52		7;			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				
	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 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 - 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.	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				
18	TO04B53		7;			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				
	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 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 - 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.	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				
19	TO04B54		7;			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				
	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 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 - 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.	376				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	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				
ESD 5	Code	No.	Technology	Human	Organisation	System of Organisations
I	Incorrect configuration					
1	TO05B111 Pilot tiredness - Inadequate workload distribution	167		13; 22;	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 SOP for take-off procedure in terms of determining of aircraft configuration.	198				
	Incorrect stab-trim setting	258				
	Undetected incorrect takeoff configuration	259				
2	TO05B112 Pilot tiredness - Inadequate workload distribution	167		13; 22;	38; 41;	50; 51; 54; 55; 58; 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	151				
	Flaws in pilot requirements definition process and/or training methodology	168				
3	TO05B12 Unintuitive and / or error prone system manual - FMC	217		13; 22;	38; 41;	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				
4	TO05B21 Pilot tiredness - Inadequate workload distribution	167		13; 22;	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 the SOP in terms of PNF flight parameters / situation monitoring or / and passive contribution to the PF duties	151				
	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; 59; 60; 61; 62; 63
	Flaws in pilot requirements definition process and/or training methodology	168				
II	Take-off configuration warning					
6	TO05B311 Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - TOCW System	229	3;	13; 22;	38; 41;	50; 51; 54; 55; 58; 59; 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 configuration before application of take-off power.	201				
	Incorrect stab-trim setting	258				
	Undetected incorrect takeoff configuration	259				
7	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; 59; 60; 61; 62; 63
	Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150				
	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 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 configuration before application of take-off power.	201				
	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; 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 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				
	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 configuration before application of take-off power.	201				
	Incorrect stab-trim setting	258				
	Undetected incorrect takeoff configuration	259				

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; 60; 61; 62; 63
		Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Power supply system components	230				
		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				
		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 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 process and/or training methodology	149	2;	13; 22;	38; 41;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63
		Maintenance technician / airworthiness specialist tiredness - Inadequate workload distribution	150				
		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 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 configuration before application of take-off power.	201				
		Incorrect stab-trim setting	258				
		Undetected incorrect takeoff configuration	259				
11	TO05B33	not identifiable at the moment			13; 22;	38; 41;	50; 51; 54; 55; 58; 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	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 configuration before application of take-off power.	201				
		Incorrect stab-trim setting	258				
		Undetected incorrect takeoff configuration	259				
III		Flight crew rejects take-off					
12	TO05B411	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
		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 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 configuration before application of take-off power.	201				
		Incorrect stab-trim setting	258				
		Undetected incorrect takeoff configuration	259				
13	TO05B412	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
		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 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 configuration before application of take-off power.	201				
		Incorrect stab-trim setting	258				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
14	TO05B42	Undetected incorrect takeoff configuration	259			
		not identifiable at the moment		13; 22;	38; 41;	50; 51; 54; 55; 58; 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	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 configuration before application of take-off power.	201			
		Incorrect stab-trim setting	258			
		Undetected incorrect takeoff configuration	259			
IV		Failure to achieve maximum braking				
15	TO05B51	Adverse weather in terms of heavy rain or icing conditions resulted with decreased RWY surface friction rate	45	13; 22;	38; 41;	48; 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			
		Poor application of T/O & RTO procedure, use of MET / ATIS information, aircraft handling	200			
		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			
		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			
		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 configuration before application of take-off power.	201			
		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 rejected take-off	46			
		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				
16	TO05B52	System failure affecting aircraft configuration, controllability and/or flying qualities	25	7; 9;	13; 22;	38; 41;
		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			
		Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake).	366			
		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 configuration before application of take-off power.	201			
		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 rejected take-off	46			
		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				
17	TO05B53	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	199			
		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			

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 configuration before application of take-off power.	201			
	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 rejected take-off	46			
	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			
V 18	Aircraft stalls after rotation not identifiable at that level	2; 3;	13; 22;	38; 41;	50; 51; 54; 55; 58; 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	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 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 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	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 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			
19	Lack of adherence to SOP in terms of awareness on supporting systems warning - stickshaker	197	2; 3;	13; 22;	38; 41;
	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			
	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 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 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	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 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			
20	System failure affecting the operation of primary instruments / displays or standby instruments	26	2; 3;	13; 22;	38; 41;
					50; 51; 54; 55; 58; 59; 60; 61; 62; 63

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	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 components	161				
	Flaws in manufacturer quality control process - Stickshaker system components	266				
	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 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 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	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 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				
	System failure affecting the operation of primary instruments / displays or standby instruments	26				
	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				
	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				
	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				
	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 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 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	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				

Code	Identifiable precursors	No.	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 - 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				
VI	Flight crew fails to regain control					
22	TO05B71 not identifiable at that level		2; 3; 6;	13; 22;	38; 41;	48; 50; 51; 54; 55; 58; 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	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 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 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	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 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				
	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 components	161				
	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	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				
	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				
23	TO05B72 Pilot tiredness - Inadequate workload distribution	167	2; 3; 6;	13; 22;	38; 41;	48; 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				
	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 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 instruments	26				

Code	Identifiable precursors	No. SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	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	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 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			
	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 components	161			
	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	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			
	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;
	Pilot tiredness - Inadequate workload distribution	167			48; 50; 51; 54; 55; 58;
	Lack of adherence to AFM in terms of emergency procedures - stall recovery	292			59; 60; 61; 62; 63
	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			
	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 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 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	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 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			
	Contaminated wing	12			
	Extreme icing conditions encounter	20			
	System failure affecting the operation of primary instruments / displays or standby instruments	26			

Code	Identifiable precursors	No. SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	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 components	161			
	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	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 - anti-ice fluid HOT	213			
	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			
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; 59; 60; 61; 62; 63
	Pilot tiredness - Inadequate workload distribution	167			
	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 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 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 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	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 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			
	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 components	161			
	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	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 - anti-ice fluid HOT	213			
	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			

Code	Identifiable precursors	No. SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	Bird strike	34			
	Contaminated Runway	39			
	Tire burst	80			
	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 ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162			
	Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - 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 integrity monitoring	401			
	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	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			
7 TO09B22	not identifiable at that level	9;	13; 18; 22;	31; 38; 41;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63
	Wildlife incursion	5			
	Bird strike	34			
	Contaminated Runway	39			
	Tire burst	80			
	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 ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162			
	Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - 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 integrity monitoring	401			
	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	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			
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; 59; 60; 61; 62; 63
	Wildlife incursion	5			
	Bird strike	34			
	Contaminated Runway	39			
	Tire burst	80			
	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 ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162			
	Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - 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 integrity monitoring	401			
	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	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			
	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			

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	34				
	Contaminated Runway	39				
	Tire burst	80				
	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 ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162				
	Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - 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 integrity monitoring	401				
	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	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				
	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					
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				
	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 ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162				
	Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - 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 integrity monitoring	401				
	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	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				
	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	TO09B34 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				
	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 ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162				
	Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216				

Code	Identifiable precursors	No.	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 - Landing gear components	358					
	Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401					
	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	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					
	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					
IV	Failure to achieve maximum braking						
12	TO09B41	Convective weather - heavy rain resulted with wet RWY surface	75	9;	13; 18; 22;	31; 38; 41;	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				
		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				
		Poor application of T/O & RTO procedure, computation of T/O parameters	260				
		Wildlife incursion	5				
		Bird strike	34				
		Contaminated Runway	39				
		Tire burst	80				
		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 ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162				
		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - 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 integrity monitoring	401				
		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	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				
		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				
13	TO09B42	System failure affecting aircraft configuration, controllability and/or flying qualities	25	7; 9;	13; 18; 22;	31; 38; 41;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63
		Contaminated Runway	39				
		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 ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216				
		Flaws in aircraft system maintenance process definition - marshalling/rolling/taxiing control related system and components (incl. brake).	366				
		Wildlife incursion	5				
		Bird strike	34				
		Contaminated Runway	39				
		Tire burst	80				
		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 ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162				

Code	Identifiable precursors	No. SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations		
	Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - 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 integrity monitoring	401					
	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	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					
	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	TO09B43	Pilot tiredness - Inadequate workload distribution	167	9;	13; 18; 22;	28; 29; 30; 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, braking initiation sequence	199				
		Wildlife incursion	5				
		Bird strike	34				
		Contaminated Runway	39				
		Tire burst	80				
		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 ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162				
		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - 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 integrity monitoring	401				
		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	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				
		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				
V		Flight crew fails to maintain control (Take-off continued)					
15	TO09B51	not identifiable at that level		9;	13; 18; 22;	31; 38; 41;	50; 51; 54; 55; 58; 59; 60; 61; 62; 63
		Wildlife incursion	5				
		Bird strike	34				
		Contaminated Runway	39				
		Tire burst	80				
		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 ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162				
		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - 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 integrity monitoring	401				
		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	458				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations	
	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					
16	TO09B52	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	5					
	Bird strike	34					
	Contaminated Runway	39					
	Tire burst	80					
	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 ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162					
	Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - 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 integrity monitoring	401					
	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	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					
17	TO09B53	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	5					
	Bird strike	34					
	Contaminated Runway	39					
	Tire burst	80					
	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 ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162					
	Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - 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 integrity monitoring	401					
	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	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					
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	5					
	Bird strike	34					
	Contaminated Runway	39					
	Tire burst	80					
	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 ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162					
	Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - 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 integrity monitoring	401					

Code	Identifiable precursors	No.	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 components	454					
	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					
ESD 10	Code	identifiable precursors	No.	Technology	Human	Organisation	System of Organisations
I		Pitch Control Problem					
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 configuration.	198				
		Incorrect stab-trim setting	258				
2	TO10B1112	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 speed bug checklist preparation and verification.	419				
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; 59; 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; 59; 60; 61; 62; 63
		Pilot tiredness - Inadequate workload distribution	167				
		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; 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 SOP for take-off procedure in terms of checking take-off configuration before application of take-off power.	201				
		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; 59; 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
		Flaws in manufacturer quality control process - FCS system components	421				
8	TO10B1313	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
		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 - FCS systems or components	422				
9	TO10B1314	Wildlife incursion	5	3; 7;	22;		49; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
		Bird strike	34				
		Contaminated Runway	39				
		Tire burst	80				
		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 ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162				
		Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - 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 integrity monitoring	401				
		Flaws in aircraft system maintenance process definition - Landing gear components.	377				
		Flaws in manufacturer quality control process - Landing gear components.	376				
10	TO10B132	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
		Slow rotation (i.e., low pitch rate)	371				
		Inadequate certification process and / or flaws in methodology concerning verification 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				
II		Flight crew rejects to take-off					
11	TO10B211	Pilot tiredness - Inadequate workload distribution	167	3; 7;	22;		49; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63

Code	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 instruments	26				
	Bird strike	34				
	Contaminated Runway	39				
	Tire burst	80				
	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				
	Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162				
	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 configuration before application of take-off power.	201				
	Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216				
	Incorrect stab-trim setting	258				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358				
	Slow rotation (i.e., low pitch rate)	371				
	Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401				
	Lack of adherence to SOP for take-off procedure in terms of speed bug checklist preparation and verification.	419				
	Inadequate certification process and / or flaws in methodology concerning verification 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				
	Flaws in aircraft system maintenance process definition - Landing gear components.	377				
	Flaws in manufacturer quality control process - Landing gear components.	376				
12 TO10B212	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 instruments	26				
	Bird strike	34				
	Contaminated Runway	39				
	Tire burst	80				
	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				
	Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162				
	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 configuration before application of take-off power.	201				
	Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216				
	Incorrect stab-trim setting	258				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358				
	Slow rotation (i.e., low pitch rate)	371				
	Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401				
	Lack of adherence to SOP for take-off procedure in terms of speed bug checklist preparation and verification.	419				
	Inadequate certification process and / or flaws in methodology concerning verification 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				
	Flaws in aircraft system maintenance process definition - Landing gear components.	377				
	Flaws in manufacturer quality control process - Landing gear components.	376				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
13	TO10B22	not identifiable at that level		3; 7;	22;	49; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
	Wildlife incursion	5				
	System failure affecting the operation of primary instruments / displays or standby instruments	26				
	Bird strike	34				
	Contaminated Runway	39				
	Tire burst	80				
	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				
	Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162				
	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 configuration before application of take-off power.	201				
	Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216				
	Incorrect stab-trim setting	258				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358				
	Slow rotation (i.e., low pitch rate)	371				
	Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401				
	Lack of adherence to SOP for take-off procedure in terms of speed bug checklist preparation and verification.	419				
	Inadequate certification process and / or flaws in methodology concerning verification 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				
	Flaws in aircraft system maintenance process definition - Landing gear components.	377				
	Flaws in manufacturer quality control process - Landing gear components.	376				
III		Failure to achieve maximum braking				
14	TO10B31	Convective weather - heavy rain resulted with wet RWY surface	75	3; 7;	22;	49; 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				
	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				
	Poor application of T/O & RTO procedure, computation of T/O parameters	260				
	Wildlife incursion	5				
	System failure affecting the operation of primary instruments / displays or standby instruments	26				
	Bird strike	34				
	Contaminated Runway	39				
	Tire burst	80				
	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				
	Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162				
	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 configuration before application of take-off power.	201				
	Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216				
	Incorrect stab-trim setting	258				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358				
	Slow rotation (i.e., low pitch rate)	371				
	Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401				
	Lack of adherence to SOP for take-off procedure in terms of speed bug checklist preparation and verification.	419				

Code	Identifiable precursors	No.	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 - 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				
	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	25	3; 7;	22;		49; 50; 51; 54; 55; 58; 59; 60; 61; 62; 63
	Contaminated Runway	39				
	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 ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216				
	Flaws in aircraft system maintenance process definition - marshalling/rolling/taxing control related system and components (incl. brake).	366				
	Wildlife incursion	5				
	System failure affecting the operation of primary instruments / displays or standby instruments	26				
	Bird strike	34				
	Contaminated Runway	39				
	Tire burst	80				
	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				
	Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162				
	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 configuration before application of take-off power.	201				
	Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216				
	Incorrect stab-trim setting	258				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358				
	Slow rotation (i.e., low pitch rate)	371				
	Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401				
	Lack of adherence to SOP for take-off procedure in terms of speed bug checklist preparation and verification.	419				
	Inadequate certification process and / or flaws in methodology concerning verification 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				
	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				
16	TO10B33	167	3; 7;	22;	28; 29; 30;	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, braking initiation sequence	199				
	Wildlife incursion	5				
	System failure affecting the operation of primary instruments / displays or standby instruments	26				
	Bird strike	34				
	Contaminated Runway	39				
	Tire burst	80				
	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				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162				
	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 configuration before application of take-off power.	201				
	Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216				
	Incorrect stab-trim setting	258				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358				
	Slow rotation (i.e., low pitch rate)	371				
	Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401				
	Lack of adherence to SOP for take-off procedure in terms of speed bug checklist preparation and verification.	419				
	Inadequate certification process and / or flaws in methodology concerning verification 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				
	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				
IV	Aircraft fails to rotate and lift off					
17	TO10B41					
	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	5				
	System failure affecting the operation of primary instruments / displays or standby instruments	26				
	Bird strike	34				
	Contaminated Runway	39				
	Tire burst	80				
	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				
	Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162				
	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 configuration before application of take-off power.	201				
	Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216				
	Incorrect stab-trim setting	258				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358				
	Slow rotation (i.e., low pitch rate)	371				
	Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401				
	Lack of adherence to SOP for take-off procedure in terms of speed bug checklist preparation and verification.	419				
	Inadequate certification process and / or flaws in methodology concerning verification 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				
	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	5				
	System failure affecting the operation of primary instruments / displays or standby instruments	26				
	Bird strike	34				
	Contaminated Runway	39				

Code	Identifiable precursors	No.	SPIs: Technology	SPIs: Human	SPIs: Organisation	SPIs: System of Organisations
	Tire burst	80				
	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				
	Lack of adherence to ICAO Annex 14 SARPs. Poor or inefficient bird hazard reduction procedure	162				
	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 configuration before application of take-off power.	201				
	Lack of adherence to ICAO Annex 14 SARPs in terms of RWY maintenance - presence of contaminations.	216				
	Incorrect stab-trim setting	258				
	Inadequate certification process and / or flaws in methodology concerning verification of the system / product compliance with requirements - Landing gear components	358				
	Slow rotation (i.e., low pitch rate)	371				
	Lack of adherence to SARPs included in ICAO Annex 14 in terms of airport fence integrity monitoring	401				
	Lack of adherence to SOP for take-off procedure in terms of speed bug checklist preparation and verification.	419				
	Inadequate certification process and / or flaws in methodology concerning verification 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				
	Flaws in aircraft system maintenance process definition - Landing gear components.	377				
	Flaws in manufacturer quality control process - Landing gear components.	376				