Analysis of existing regulations and certification processes

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This report provides an analysis of existing European certification and rulemaking processes for aircraft systems, flight operations, continued airworthiness, air traffic services and airports. The shortcomings and bottlenecks in the existing processes have been identified and evaluated.

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Acronyms

Acronym	Definition
AAT	Aeronautics and Air Transport
ACARE	Advisory Council for Aviation Research and Innovation in Europe
ACAS	Airborne Collision Avoidance Systems
ADM	Aerodrome Design Manual
AIM	Accidents-Incidents Model
AIS	Aeronautical Information Services
AMC	Acceptable Means of Compliance
AMOC	Alternative Methods Of Compliance
ANS	Air Navigation Service
ASCOS	Aviation Safety and Certification of new Operations and Systems
ASM	Airspace Management
A-SMGCS	Advanced Surface Movement Guidance and Control Systems
ATFM	Air Traffic Flow Management
ATM	Air Traffic Management
ATS	Air Traffic Service
AUR	Airspace Usage Requirements
CAA	Civil Aviation Authority
CAP	Continuing Airworthiness of Type Design
CAST	Causal Model for Air Transport Safety
CNS	Communication, Navigation, and Surveillance
CM	Certification Manager
CRD	Comment Response Document
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
ESA	European Space Agency

Acronym	Definition
ESASI	European Society of Air Safety Investigators
ESSI	European Strategic Safety Initiative
EU	European Union
EUROCAE	European Organisation for Civil Aviation Equipment
EUROCONTROL	European Organisation for the Safety of Air Navigation
FAA	Federal Aviation Administration
FAST	Future Aviation Safety Team
FP7	7th Framework Programme
GM	Guidance Material
IATA	International Air Transport Association
IBIS	ICAO Bird Strike Information System
ICAO	International Civil Aviation Organisation
IRP	Integrated Risks Picture
NAA	National Aviation Authority
NPA	Notice of Proposed Amendment
PANS-RAC	Procedures for Air Navigation Services - Rules of the Air and Air Traffic Services
SARPs	Standards and Recommended Practices
SERA	Standardised European Rules of the Air
SES	Single European Sky
SESAR	Single European Sky ATM Research
SMM	Safety Management Manual
SMS	Safety Management System
SOIR	Simultaneous Operations on Parallel or Near-Parallel Instrument Runways
SOPs	Standard Operating Procedures
SSP	State Safety Program
STCP	Supplemental Type Certification
SRC	Safety Regulation Commission
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

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Executive Summary

The objective of this study is to analyse the existing regulations and certification processes and to identify potential shortcomings and bottlenecks in the current certification processes. The document firstly provides an overview of the existing regulations and certification processes. Next, shortcomings and bottlenecks are identified via two complementary ways.

Firstly, an approach was followed that investigated which safety occurrences have relatively high or increasing risk, and which areas have a relatively low level of implementation of regulations. This analysis made use of data from EASA and SRC annual safety reports [1, 5]. The underlying assumptions were:

- Classes of safety occurrences for which the risk is relatively high or increasing may point to shortcomings of the associated regulations and certification processes; some of which may be associated to interactions between regulatory domains; and
- Areas where the implementation level of regulations is low may point to bottlenecks in the associated regulations and certification processes.

The main conclusions regarding shortcomings and bottlenecks in the current regulations and certification processes from this analysis are:

- In many cases, human errors can be identified as direct cause of the accidents, both when piloting as well as during maintenance works. Elaboration of design techniques in the area of piloting as well as maintenance to better address the avoidance of error-prone solutions is necessary. There is a need for developing adequate regulations addressing the human-machine interface, ergonomics and human limitations aspects, as well as eliminating error-prone solutions. Due to the importance of human factors aspects as source of risks, this aspect must be considered whatever the regulatory domain (airborne and ground).
- Elaboration of tools ensuring proper and full execution of ICAO Annex 14 SARPs at Aerodromes. Lack of regulatory requirements to provide flight crews with a consistent format of take-off and landing data for all runway conditions. Inadequate regulation for the provision of correct, up-to-date and timely runway condition reports. Currently, no international standard exists for measuring and reporting runway conditions.
- CNS/ATM can be identified as a critical area for safety benefit due to the importance of human factors aspects as source of risks, level of change of operational concepts for the coming years evolving from SESAR, no visible improvement regarding the situation of ATM support functions (e.g. software), and level of implementation of interoperability regulation. Improvements in this field could help significantly in further reducing commercial aviation incidents and accidents. In this context, it should be noted that improving the collection of incidents and accident statistics to better understand the severity of incidents in the CNS/ATM domain may bring additional insight and benefits.

Secondly, a review was conducted of existing studies on identified shortcomings and bottlenecks in the certification process and regulations. The resulting identified shortcomings and bottlenecks are summarised as follows:

- Several shortcomings exist in the following certification areas: the aircraft certification process; aviation safety data management; the interfaces between maintenance, operations, and certification; major repairs and modifications; and the safety oversight process.
- There are certain risks with the use of safety cases in certification. Various potential shortcomings of the use of safety cases were identified in a military setting, but are of potential interest for the civil domain as well. It should be considered that safety cases will not lead to a culture of 'paper safety' at the expense of real safety, and that they are only used if providing value for money and improvement over the current solutions. It should be considered that the safety cases need to be improved due to the current level of maturity of stakeholders regarding this approach. Safety cases in itself are a good approach, and ASCOS further study must take into account lessons learned and recommendations from the NIMROD study [29].
- There are many issues associated to the current ATM safety regulation framework, regarding e.g., fragmentation and variability, safety accountability, overlap and contradictions, and complexity. It is noted that current EASA initiatives aim to address these shortcomings.

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1 Introduction

1.1 Background

The work contributes directly to the high level Flight path 2050 [22] and ACARE Vision 2020 [20, 21] safety goals. By 2020, the target is 1) reducing accident rate by 80%, and 2) reducing human error and its consequences. Figure 1 gives the fatal accident rate for commercial operations with western-built jet aircraft over the period 1980 until 2010. As can be observed, there has been little to no improvement of aviation safety worldwide from about 2004 onwards. Europe, the United States and other 'western' regions show a similar trend.

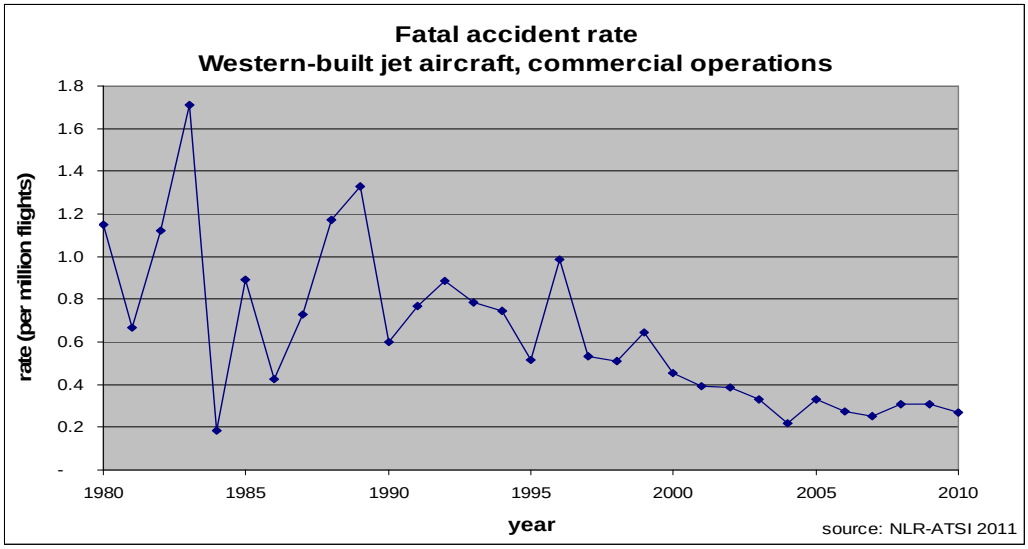

Figure 1 Fatal accident rates over the period 1980 until 2010

ASCOS aims to break this chain of 'stagnation' of safety improvement through introduction of novel and innovative certification adaptations, which will ease the certification and approval process of safety enhancement systems and operations. Within ASCOS, WP1 aims to develop safety based certification process adaptations. As an important first step, WP1.1 aims to analyse the existing regulations and certification processes, in order to identify shortcomings and bottlenecks in these regulations and certification processes.

The considered scope of this analysis refers to a total aviation context, including the domains Aircraft/airworthiness; Operations and FCL; ATM/ANS; and Aerodromes (ADR). The following figure illustrates this by showing the structure of EASA's regulations addressing these domains.

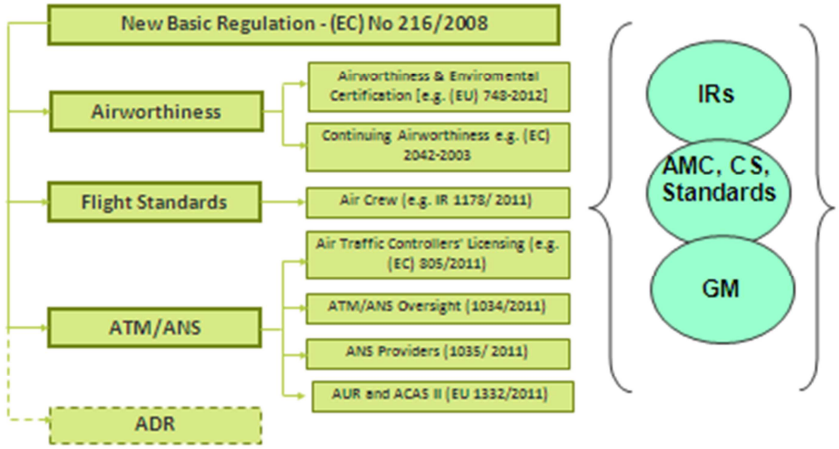

Figure 2 Structure of EASA regulations, including the domains considered.

1.2 Objectives

As a part of the ASCOS WP1 Certification Process, the objectives of this D1.1 deliverable are:

1. To analyse the existing regulations and certification processes;
2. To identify potential shortcomings and bottlenecks in the current certification processes.

1.3 Approach

Shortcomings and bottlenecks are distinguished as follows:

- A shortcoming is 'a fault or failure to meet a certain standard, typically in a person's character, a plan or a system'. In the context of the analysis the term shortcoming is used to describe the situation where the regulation is fully implemented but proves to be inadequate.
- A bottleneck is; 'a phenomenon where the performance or capacity of an entire system is limited by a single or limited number of components or resources'. In the context of the analysis the term bottleneck is used to describe the situation where the regulation is not implemented at the expected level.

As a first step, this document provides a description of existing regulations and certification procedures. This includes a catalogue of existing regulations a catalogue of existing administrative procedures & technical requirements, and a high-level description of the certification-approach in selected domains.

Next, the document identifies shortcomings and bottlenecks via two complementary ways.

Firstly, an analysis is conducted based on reported safety occurrences and on the degree of implementation level of the regulations in various domains of aviation. This analysis makes use of data from EASA and SRC annual safety reports [1, 5]. The underlying assumptions are:

- Classes of safety occurrences for which the risk is relatively high or increasing may point to *shortcomings* of the associated regulations and certification processes; some of which may be associated to interactions between regulatory domains; and
- Areas where the implementation level of regulations is low may point to *bottlenecks* in the associated regulations and certification processes.

Secondly, a review is conducted of existing studies of identified shortcomings and bottlenecks in the certification process and regulations.

The document then consolidates the identified shortcomings and bottlenecks.

1.4 Structure of the document

This document is organised as follows:

- Section 2 provides an overview of existing regulations and certification procedures.
- Section 3 investigates reported safety occurrences.
- Section 4 reports on the degree of implementation of regulation in various domains.
- Section 5 identifies shortcomings and bottlenecks in certification and regulations using the results of Sections 3 and 4.
- Section 6 identifies shortcomings and bottlenecks in certification and regulations from existing sources.
- Section 7 provides conclusions and recommendations.
- Section 8 lists references.

The document includes the following appendices:

- Appendix A provides a catalogue of existing regulations;
- Appendix B provides a catalogue of existing administrative procedures and technical requirements;
- Appendix C presents the indication on potential bottlenecks' / shortcomings' consequence and recommendations how to proceed;
- Appendix D presents the identification of bottlenecks and shortcomings from existing studies.

2 Overview of existing regulations and certification procedures

2.1 Introduction to the European regulatory system in civil aviation

This section provides a short introduction to the European regulatory system in the field of civil aviation, considering also relevant global aspects.

Currently the most significant role in the creation of the legal and regulatory environment in *global* aviation is played by ICAO – International Civil Aviation Organisation. It can be described as follow:

*"A specialized agency of the United Nations, the **International Civil Aviation Organization (ICAO)** was created in 1944 to promote the safe and orderly development of international civil aviation throughout the world. It sets standards and regulations necessary for aviation safety, security, efficiency and regularity, as well as for aviation environmental protection. The Organization serves as the forum for cooperation in all fields of civil aviation among its 191 Member States."*

Source: ICAO Website

Consisted of 191 country-members organisation provides Standards and Recommended Practices critical for safety, security and sustainable development air transport domains. Amongst areas covered by ICAO international transport, aerodromes as well as accident investigation related issues can be found. Every country-member of ICAO is obliged to incorporate the agreed standard in its legal framework. As it is mentioned later lack of tools ensuring proper execution of standards result with many deviations amongst countries and regions both in world and European scale. It is especially clearly visible when aerodromes are taken into consideration.

Historically, the Federal Aviation Administration (FAA) also played an important for development of safe aviation. Especially in the past the US civil aviation office can be thought as a leader in definition of provisions concerning air transport and aircraft certification procedures. Strong position of American aeronautic industry in that time resulted in approving more or less consistent with American ones European regulations by Joint Aviation Authorities (JAA). Currently US an EU position in creating standards and regulations for air transport and industry can be considered as rather balanced but also independent.

The most important entity regulating air transport in Europe is the European Aviation Safety Agency (EASA). Created in 2002, EASA is an Agency of the European Union. EASA was set up by a Council and Parliament regulation and was given specific regulatory and executive tasks in the field of civil aviation safety and environmental protection. EASA develops common safety and environmental rules at the European level. It monitors the implementation of standards through inspections in the Member States and provides the necessary technical expertise, training and research. EASA works together with the National Aviation

Authorities (NAAs), which continue to carry out many operational tasks, such as certification of individual aircraft or licensing of pilots. Current area of EASA competency is depicted in Figure 3.

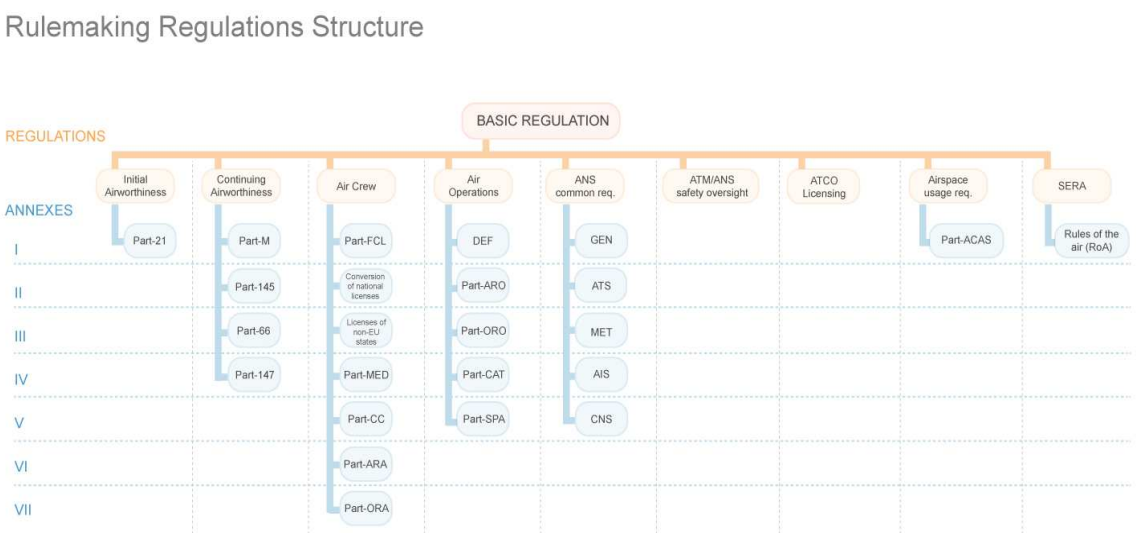

Figure 3: EASA area of competency.

European Commission regulation 1108/2009 extends the EASA remits also to the aerodrome domain.

Activities related to air transport are in most cases are directly touched by national law rather international. However as it was mentioned above EU members are obliged to implement EASA or ICAO (in case of Aerodromes) provisions. In many cases the implementation process takes time. Issues related to the implementation process are more described in unit concerning regulation implementation degree.

2.2 Catalogues of existing regulations, administrative procedures and technical requirements

Appendix A provides a detailed catalogue of existing regulation. Appendix B provides a detailed catalogue of related administrative procedures and technical requirements. The catalogue provides evidence of the complexity of the current regulations and an inherent lack of co-ordinated design of the regulations. The regulations have, in the main, evolved within a specific regulatory domain with limited cross-domain considerations. It is the lack of an overall design that renders a prediction of their combined effectiveness and weaknesses impractical within the constraints of ASCOS.

2.3 Certification in the air operator domain

This section describes the certification process in the air operator domain based on information provided by ASCOS D1.2.

The way in which prospective air operators are certified differ from state to state. Therefore, to provide a general description of the air operator certification process, reference is made to the certification process the International Civil Aviation Organisation (ICAO) advises its member states to follow[1]. In practice, many member states follow, in more or less detail, this process.

Summarized the Air Operator Certification process consists of 5 consecutive phases (Figure 4):

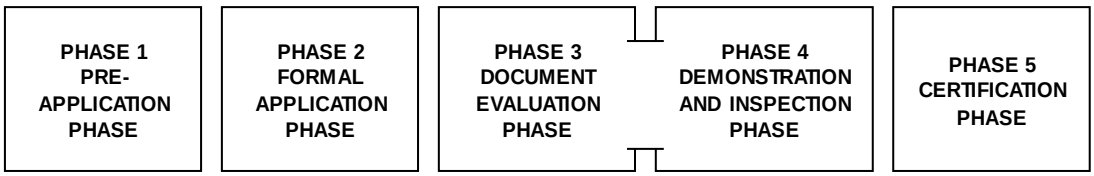

Figure 4 Air Operator Certification Process

(1) Pre-application phase

In the pre-application phase, an applicant seeking an air operator certificate (AOC) makes the initial inquiry for application. Usually a meeting is held between the NAA/CAA and the applicant. Information needed to complete the application is provided.

(2) Formal application phase

In the formal application phase, the prospective operator's formal application is (initially cursory) reviewed by the NAA/CAA and a formal application meeting is conducted with the prospective operator to discuss its application. The formal application consists of a formal application letter together with necessary attachments like draft specific operating provisions, certification job aid & schedule of events, general company's manuals (operations manual, maintenance control manual), training and checking manuals, management structure and qualification, statement of compliance, etc. Critical to the success of the entire certification process is a thorough understanding of pertinent regulations and advisory materials. The operator and key management personnel must understand which regulations apply to their intended operation.

The formal application should be submitted at least 90 days before revenue operations are expected to begin.

(3) Document evaluation phase

In the document evaluation phase the NAA/CAA performs an in-depth review of the application and all required attachments as mentioned under (2). The in-depth review is necessary to ensure that the applicant's documents and manuals meet all NAA/CAA standards and requirements.

(4) Demonstration and inspection phase

In the demonstration and inspection phase, the applicant demonstrates its operation to the NAA/CAA in accordance with applicable regulations and as it was defined in the applicant's documents and manuals that the NAA/CAA evaluated during the document evaluation phase. Further, the applicant's facilities are inspected and evaluated against the applicant's documents and manuals as well.

[1] See Model Advisory Pamphlet 001 *Certification of an Air Operator* for a full description of the process

(5) Certification phase

The certification phase is the final phase of the certification process. All certification findings are reviewed and when the NAA/CAA is convinced that the prospective operator is in compliance and will be able to be in continued compliance, the certificate and specific operating provisions are issued to the operator. The operator now has NAA/CAA approval to operate under the conditions that the specific operating provisions dictate.

2.4 EASA Internal Certification Working Procedures

In 2005 the European Aviation Safety Agency was tasked to establish the Agency's Internal Certification Working Procedures in the following areas:

- Type Certification
- ETSO-Authorisation
- Design Organisation Approval
- Alternative Procedures to Design Organisation Approval
- Production Organisation Approval
- Maintenance Organisation Approval
- Maintenance Training Organisation Approval
- Continuing Airworthiness of Type Design (CAP)
- Supplemental Type Certification (STCP)

The Certification Directorate of the Agency has decided to publish its working procedures on the Agency's website. The internal certification working procedures explain how EASA carries out its certification tasks internally. The procedures have been published for information purposes.

The procedures described in detail, step by step, the above-mentioned processes. Summary and a brief description of the published procedures, see Chapter B.1 in Appendix B.

Type Certification process is shown in Figure 5.

Applications for an EASA Type Certificate (EASA Form NR 30) shall be sent to the Applications and Procurement Services Department and made in accordance with Article 21A.15 of Annex Part 21 to Commission Regulation (EC) No. 1702/2003 and MB Decision 12/2007. After eligibility has been fully assessed and the application has been accepted by the Agency, the responsible Certification Manager (CM) will decide, whether the technical investigation will be further processed internally or if the technical investigation should be allocated to a National Aviation Authority – NAA (CAA).

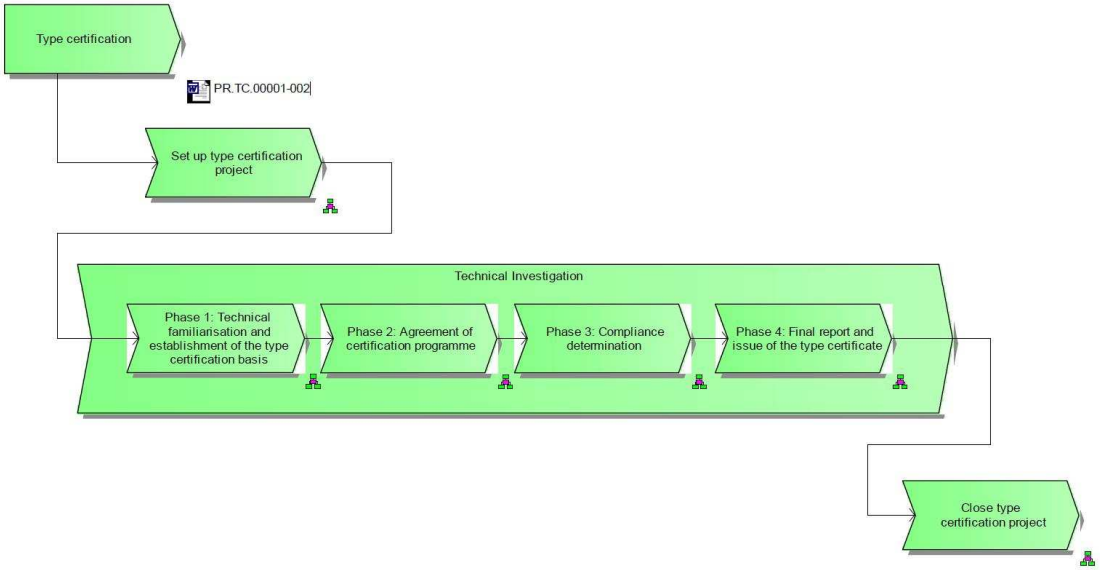

Figure 5: Type Certification – Structure of process [source EASA Procedure, Doc PR.TC.00001-002- Type certification]

In principle, the Agency shall perform itself all tasks incumbent upon it, to the extent allowed by its staffing level, the ability of its staff to perform the task and the number of tasks to be dealt with.

Where the application is further processed internally, the technical investigation is performed by the EASA Products. Certification Department, using EASA staff and/or NAA/CAA seconded staff. Individual NAA/CAA staff, selected by the EASA Products Certification Department, may be invited to participate in a specific technical task under the direct technical management of the Agency, when there is a framework service contract concerning the provision of services in place between the Agency and the NAA/CAA seconding staff. In case the Agency does not perform a product type certification task itself, this task shall be allocated to the NAA/CAA of the State of Design.

Once an application has been accepted and a certification team is established, the EASA type certification process can generally be divided in the following phases:

Phase I – Technical Familiarisation and establishment of the Type Certification Basis

The objective of this phase is to provide technical information about the project to the Team experts to enable the definition of and the agreement on the initial EASA Type Certification Basis.

Phase II – Agreement of the Certification Programme

The objective of this phase is the definition of and the agreement on the proposed means of compliance with each paragraph of the Certification Basis and the identification of the Team involvement.

Phase III – Compliance determinations

The objective of this phase is the demonstration of compliance with the Certification Basis and the acceptance of the compliance demonstration.

Phase IV- Final Report and issue of a Type Certificate

The objective of this phase is the establishment of a project final report recording details of the type investigation and, based on approval of the final report by the responsible CM, the issue of the EASA Type Certificate.

These phases are further detailed in the Flow Chart and in the Process Steps tables in EASA Procedure, Doc PR.TC.00001-002- Type certification.

2.5 Aerodromes certification

In 2003 International Civil Aviation Organisation obliged every Member State to certify all international publicly accessible airports. Requirements concerning certification procedures and guidelines were included in ICAO Annex 14 – Aerodromes and Doc 9774 titled Manual on certification of aerodromes.

Main objective of the certification is verification weather the aerodrome is capable to operate safely in a permanent way. According to the regulation certification procedure is initiated by the airport operator, conducted by NAAs/CAAs and involves control of compliance of airport infrastructure (runway, taxiways, apron, signs etc.), aerodrome operating conditions, staff competence and airport safety procedures. Issued certificate is valid for maximum three years (in case of new airport only one year) and can be suspended if any failure to comply the regulation appears. Due to the fact that the obligation of having the airport certification was established relatively recently not all international airports have obtained it yet.

As described in section 4, limited resources of National Aviation Authorities (NAAs/CAAs) in area of funds and personnel prevent the effective implementation of new regulations. Additionally the frequent inhibitor is long and complex legislative procedure. Moreover in many cases the certified airports do not meets all Standards and Recommended Practices included in Annex 14. The reason is limited funds for airport development. But the situation is going to be improved by covering the Aerodrome domain by EASA Certification Standards (Figure 6).

One of the most important features of EU regulation will be an individualised approach by customised certification basis. The idea is to apply only these CSs which are considered as applicable for particular type of airport and operations. And certainly on condition that the Essential Requirements (ERs) of the Basic Regulation are met and employed solutions ensure a level of safety equivalent to that attained by application of the relevant CSs. It is expected that such an approach will promote research into new technologies, resulting in innovative practices in area of the aerodrome industry.

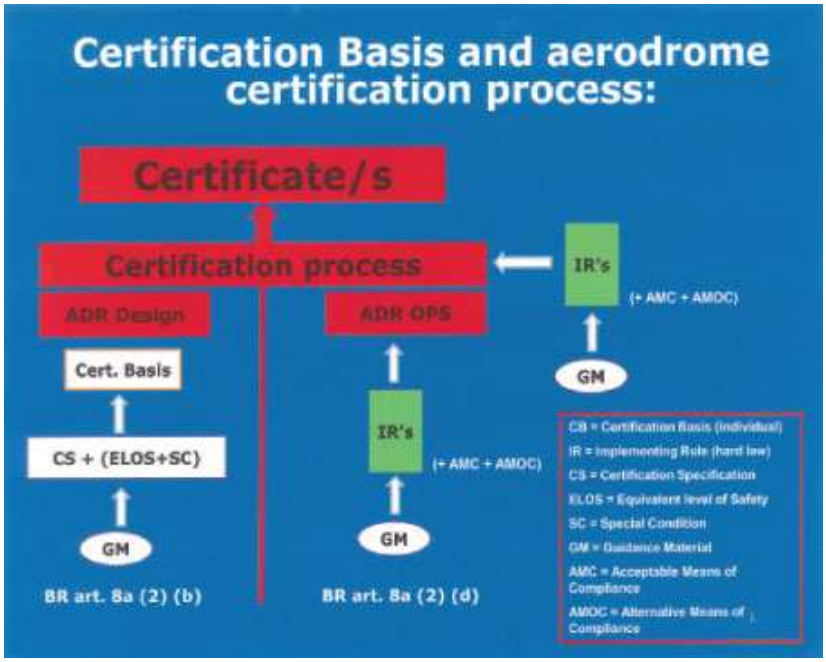

Figure 6: Certification Basis and aerodrome certification process [source: www.airport-business.com]

3 Safety occurrences reporting

This section collects information from safety occurrence reporting from EASA (Section 3.1) and EUROCONTROL SRC (Section 3.2). The objective is to identify classes of safety occurrences for which the risk appears to be high or increasing, since this can point to a shortcoming in certification and regulations. The sources for Figures in Sections 3.1 and 3.2 are the EASA annual safety review 2011 and SRC annual safety review 2012 respectively.

3.1 EASA annual safety review report 2011

3.1.1.1 Commercial Air Transport

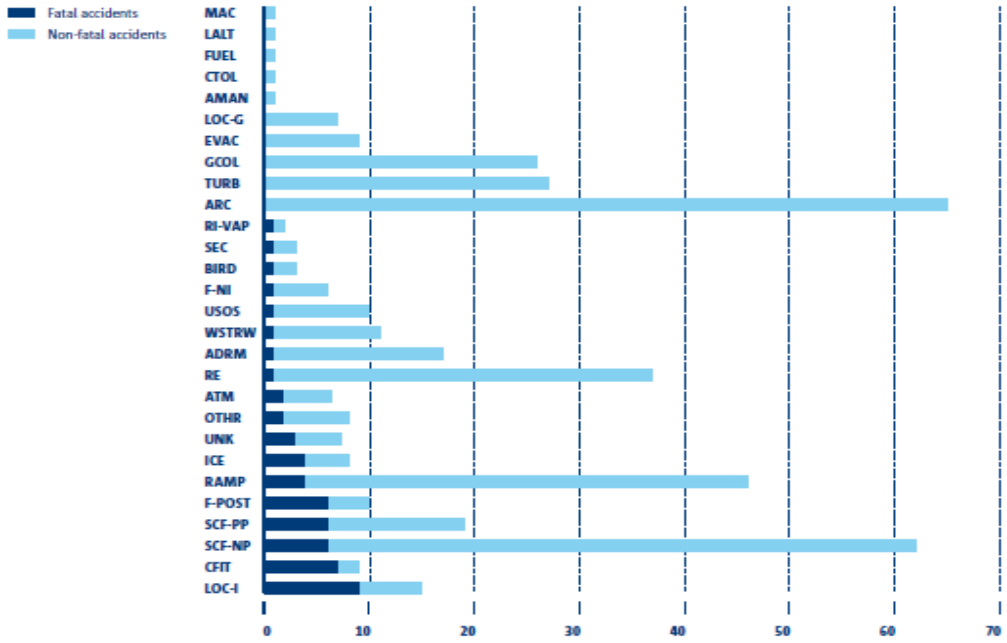

Figure 7: Accident categories for fatal & non- fatal accidents - number of accidents by EASA MS operated aeroplanes (2002-2011) Commercial Air Transport

Figure 7 shows that the accident categories with the highest number of fatal accidents in the decade of 2002 to 2011 were LOC-I ("Loss of control in flight") and CFIT ("Controlled Flight into Terrain"). Accidents assigned under LOC-I involve the momentary or total loss of control of the aircraft by the crew. As mentioned in **[1]** *"…This loss might be the result of reduced aircraft performance or because the aircraft was flown outside its capabilities for control. CFIT accidents involve the aircraft colliding with terrain while it is still under the control of the crew. Such accidents can be the result of loss of situational awareness or of errors of the crew in managing the aircraft systems. The figure also shows that the highest number of non-fatal accidents involved an ARC ("Abnormal runway contact"). These accidents include long, fast or hard landings as well as the scraping of the tail or the wing of the aircraft during take-off or landing…."*

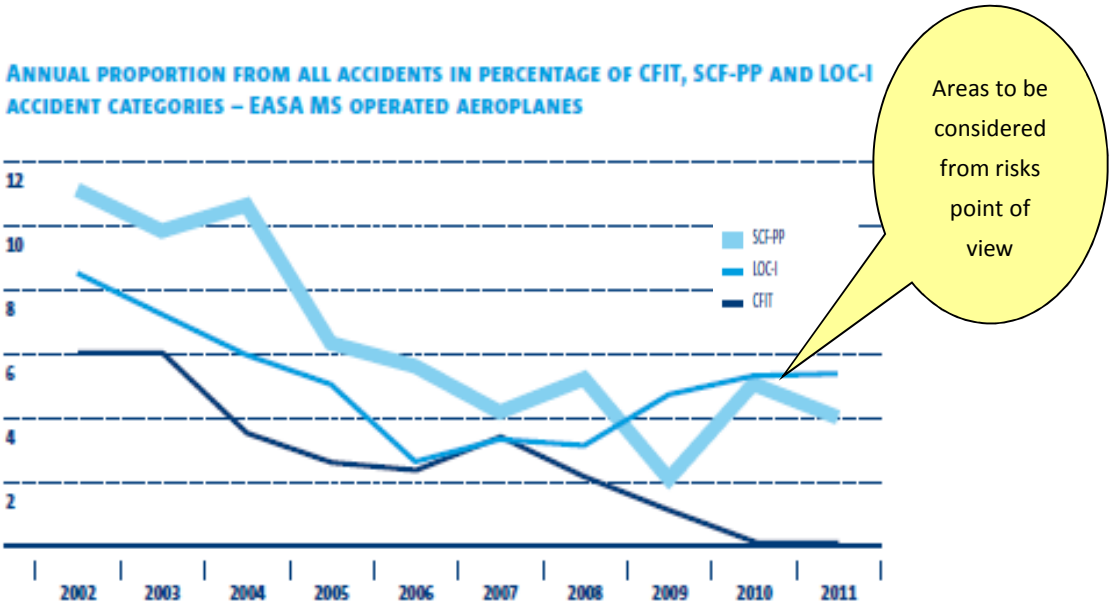

Figure 8 Annual proportion from all accidents in percentage of CFIT, SCF-PP and LOC-I accident categories- EASA MS operated aeroplanes

Figure 8 shows the trend of some of the occurrence categories over time. The graph is created by calculating the percentage of accidents which have been categorised under the occurrence categories. As mentioned in [1] from this figure it is evident that CFIT accidents involving EASA MS operated aircraft have an overall decreasing trend over the past decade. This can be attributed to technological improvements and to increased awareness of situations which may lead to such accidents.

A similar trend is also shown for accidents which involve the failure of a system or component directly related to operation of an engine SCF-PP ("System or Component failure related to power plant"). In recent years there has been an increasing trend in the number of accidents involving loss of control in flight (LOC-I).

3.1.1.2 Aerodromes

Due to the nature of flight operations, 90% of occurrences occur at or near an aerodrome. However most of them are not related directly to any aerodrome safety issues. As referred in [1], Runway excursions are considered here as safety occurrences. These safety occurrences are including accidents, serious incidents and incidents related to relevant phases of flights (mainly landing and take-off) as well as events without safety effects.

Figure 9 shows that the number of severe runway excursion presents an improvement in the recent years. Both accidents and serious incidents involving runway excursions show an overall declining trend. The number of incidents reported shows an increasing trend. The opposite direction of these trends between severe and less severe runway excursions is likely due to improved reporting.

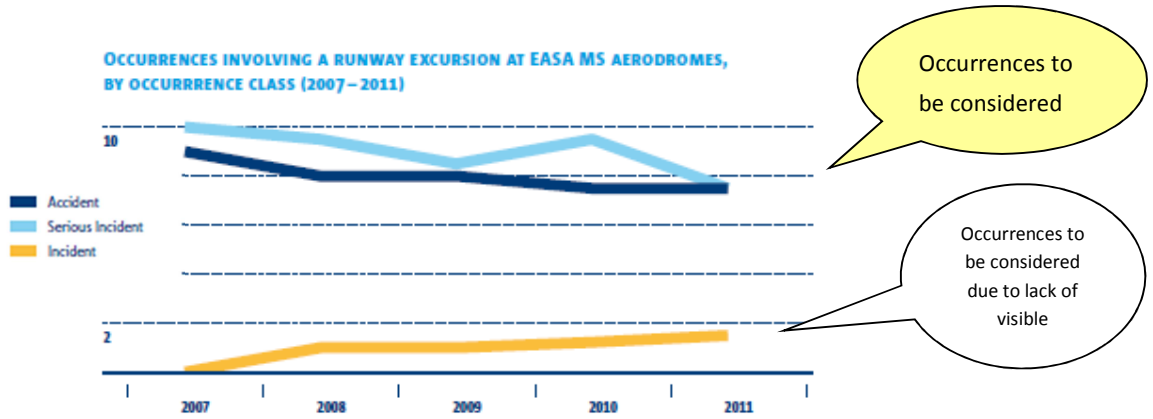

Figure 9: Occurrences (2007-2011) involving a runway excursion at EASA MS aerodromes

Figure 10 shows the number of occurrences involving a runway excursion in EASA MS Aerodromes, divided by phases of flight when the excursion happened as well as the occurrence class. Most of the excursions have occurred during the landing phase. It also shows that the severity in landing and take-off (TO) is approximately the same (50% were accidents in both flight phases).

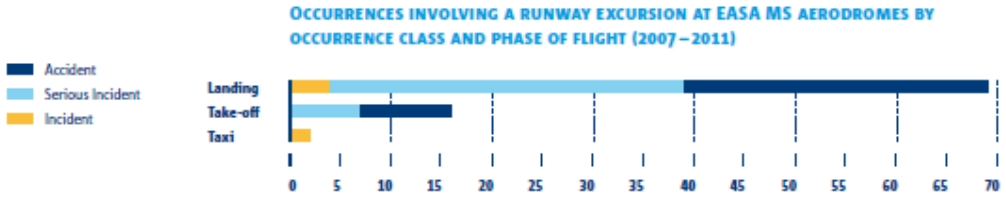

Figure 10 Occurrences (2007-2011) involving a runway excursion at EASA MS aerodromes by occurrence class and phase of flight

3.1.1.3 Air Traffic management (ATM)

The Air Traffic Management (ATM) system comprises of airborne and ground-based functions (air traffic services, airspace management and air traffic flow management) to ensure the safe and efficient movement of aircraft during all phases of flight operations.

During the investigation process two levels of ATM involvement can be allocated:

- Direct contribution – where the ATM event or item was judged to be directly in the causal chain of events and
- Indirect contribution – where the ATM event potentially increased the level of severity.

ATM related accidents

Figure 11 presents the number of accidents where ATM is indicated as having a contribution (i.e. at least one ATM contributory factor was in the chain of events. Since 2006 the number of such accidents has decreased. As mentioned earlier, the definition of these categories differs from those of other Chapters. For 2011 only preliminary data are reported. In 2010 two non-fatal accidents (one runway excursion and another collision on the ground between aircraft and vehicle) were indicated as having an Indirect ATM Contribution. Preliminary 2011 data indicates no accidents with ATM contribution.

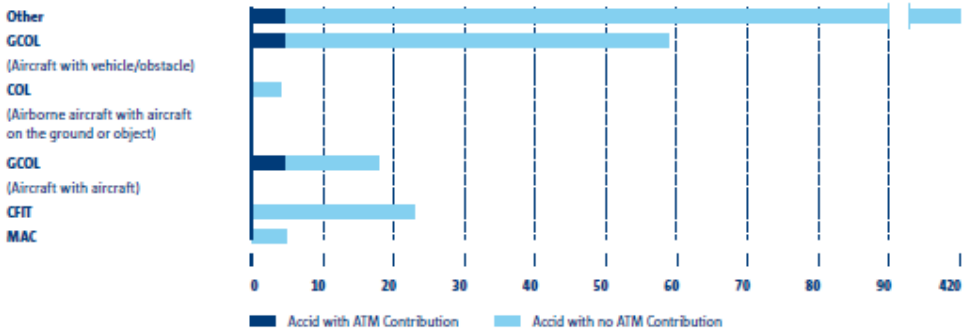

Figure 11 Accident categories for ATM related accidents in EASA MS (2005-2011)

ATM related incidents

Incident categories that are reported in large numbers are: 'Unauthorised penetration of airspace' (UAP), (also known as Airspace Infringements), 'Aircraft deviation from ATC clearance' (CLR), (which includes the Level Busts), 'Separation minima infringement' (SMI) and 'Runway incursions' (RI). Incidents involving 'inadequate aircraft separation' are categorised under 'IS'. Figure 12 shows that only a fraction of the ATM related incidents are having an ATM contribution in the chain of events.

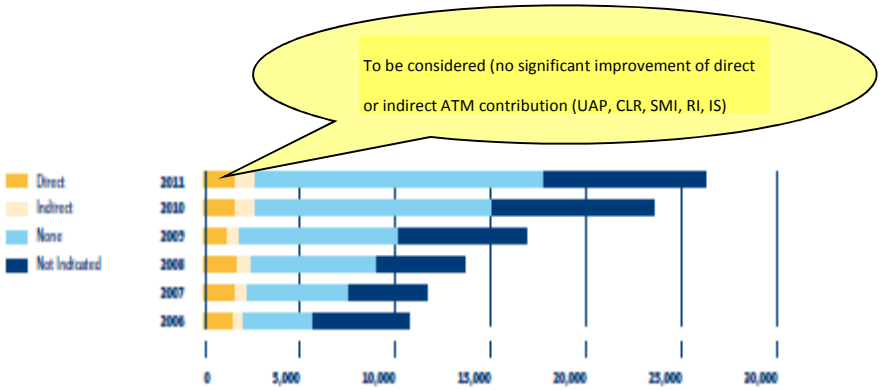

Figure 12 Number of ATM related incidents (2005-2011)

The considered severity classes are the following:

- Severity A serious incidents;
- Severity B major incidents;
- The other classes are severity C (significant), severity D (not determined), severity E (no safety impact).

The category that has the largest proportion of risk bearing incidents (severity A and B) is the SMI (Separation Minima Infringements). This category refers to occurrences in which the defined minimum separation between aircraft has been lost. Many of the incidents that have resulted in a loss of separation and categorised as risk bearing are also categorised as deviation from ATC Clearance or Unauthorised Penetration of Airspace Infringements.

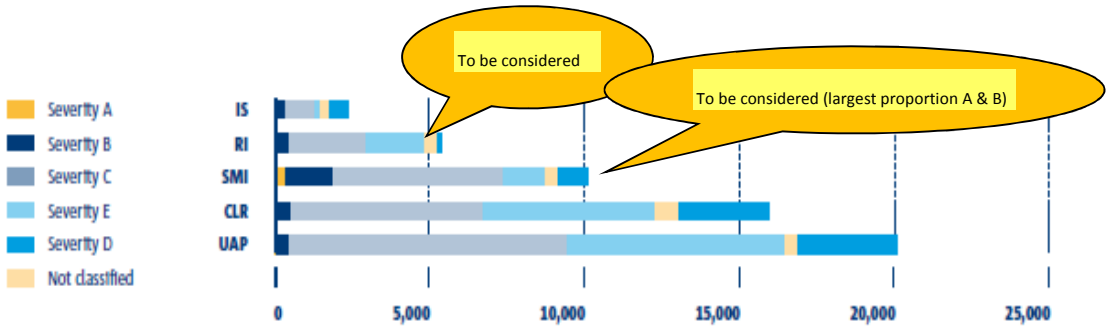

Figure 13 Number of ATM related incidents by category and severity (2005-2011)

- **SMI** refer to occurrences in which defined minimum separation between aircraft, has been lost. With the exception of 2009 and 2010, overall the total number of incidents reported is increasing every year. SMI under severity A have a decreasing trend until 2010 followed by an increase in 2011. A similar increase in severity B is indicated in the preliminary data in 2011.

- **RI** must be considered due to occurrences rates increase in 2010 although 2011 is showing an improvement.

3.2 SRC Annual safety review report 2012[5]

3.2.1.1 Accidents

Based on data collected from ECAC Members States, there were in 2011 a total of 71 accidents out of which 11 were fatal. It is important to note that the traffic is increased almost 4,8% compared to the previous year 2010. None of the reported accidents had either a direct or indirect ATM contribution (for accidents involving aircraft above 2250kg MTOM).

3.2.1.2 ATM-related Incidents

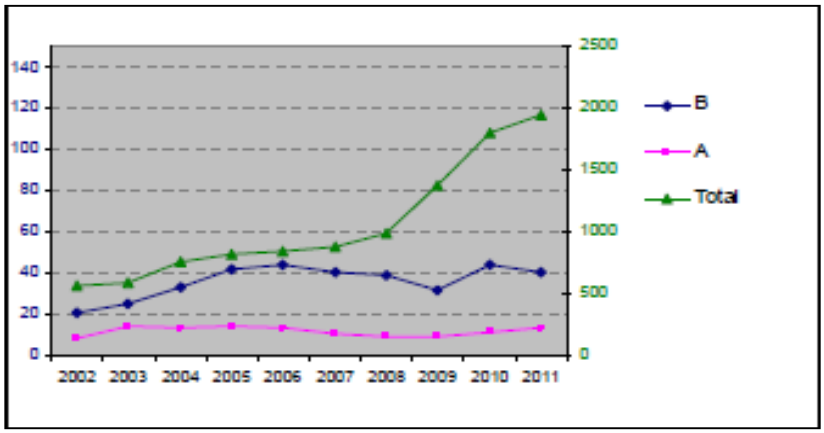

Figure 14 Total ATM related incidents (occurrence per million flight hours and severity class)

General Trends

Safety data for 2011 shows a 14.5% increase in the total number of incidents reported in comparison with the same period of 2010. When measured against traffic levels, the increase in 2011 is 7.9%.

An increase of over 26% in the absolute number of serious incidents (severity A) is observed in 2011, while the number of serious incidents, as a percentage of the total number of occurrences, raised from 0.6% to 0.7%. There is a decrease of 1.8% in the absolute number of major incidents (severity B).

Concerning the risk bearing SMI separation minima infringements, compared with the previous year's data, the data reported for 2011 shows a 12.1% increase in absolute numbers and a 5.6% increase when measured against traffic levels:

- Serious incidents (severity class A) increased in absolute numbers from 16 to 35,
- Major incidents (severity class B) increased in absolute numbers from 178 to 217.

Concerning RI (Runway Incursion in absolute figures, the number of serious runway incursions in 2011 slightly increased (23) compared with the previous year (22), whilst a decrease is shown for major events (from 77 to 62).

Concerning the UPA Unauthorised penetration of Airspace, the percentage of serious incidents (severity class A) amounts to 0.3% of the total number of reported events. This represents a small increase (0.2% in the 2010 data). However, in terms of absolute numbers of occurrences, 2011 shows a considerable increase from 4 to

12 events. The number of major airspace infringements decreased, in absolute figures, from 79 in 2010 to 68 in 2011.

However an improvement programme should be put in place due to weakness in terms of severity classification. The Figure 15 shows the number of ATM-related incidents not classified for their severity for different categories of incidents. Unfortunately, we see an increase in most areas, especially in Unauthorised Penetrations of Airspace and Separation Minima Infringements.

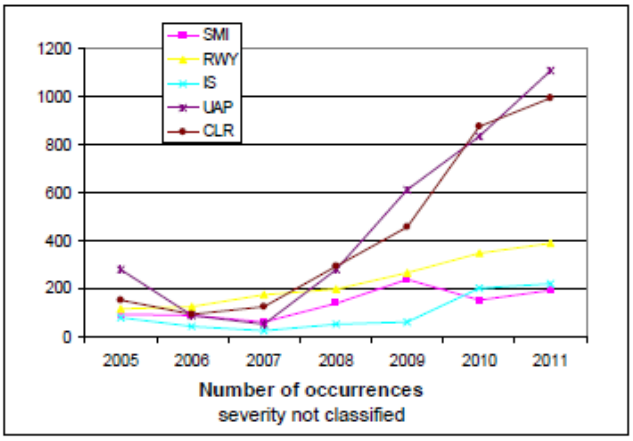

Figure 15 Severity classification of ATM incidents

3.2.1.3 Occurrences related to ATM Support Functions

The decrease observed in total numbers is also noticed in most of the subcategories; with the highest number of occurrences reported in 2011 being in the area of 'Data Processing' (as it was the case in 2010) followed by the 'Communication' and 'Surveillance' functions.

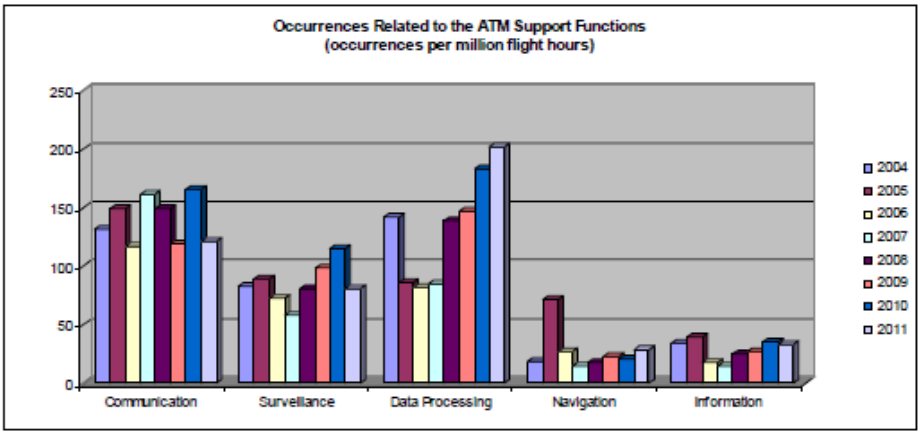

Figure 16 Occurrences Related to the ATM Support Functions (occurrences per million flight hours)

4 Degree of implementation of regulation across Europe

This section collects information regarding the degree of implementation of regulations across Europe, considering product certification (Section 4.1), aerodromes (Section 4.2), ATM/ANS (Section 4.3), and software aspects (Section 4.4). The objective is to identify areas where the degree of implementation is relatively low, as this can point to a bottleneck in certification and regulations.

4.1 Product certification

Basic Regulation (EC) No 1592/2002 of 15 July 2002 (with later amendments – see Appendix A.1) gave responsibility to the European Aviation Safety Agency for the airworthiness and environmental certification of all aeronautical products, parts, and appliances designed, manufactured, maintained or used by persons under the regulatory oversight of EU Member States. This includes all post-certification activities, such as the approval of changes to, and repairs of, aeronautical products and their components, as well as the issuing of airworthiness directives to correct any potentially unsafe situation. Furthermore, the Agency is in charge of the oversight of EU organisations involved in the design of aeronautical products, parts and appliances as well as of non-EU organisations involved in the manufacture or maintenance of such products. In these domains the Agency has taken over the certification tasks that were under the responsibility of Member States.

Community law in the area of civil aviation generally defines safety objectives at the level of essential requirements and implementing rules (see Appendix A), whereas detailed implementation aspects are included as Certification Specifications (CS) (see Appendix A.2.1) or Acceptable Means of Compliance (AMC) (see Appendix B.2). This provides flexibility, eases the understanding of the safety objectives and ensures resilience of the regulatory material in times of fast evolving technology and increasing complexity in civil aviation.

AMCs are defined as non-binding standards adopted by the Agency to illustrate means to establish compliance with the Basic Regulation and its Implementing Rules.

The AMCs issued by the Agency are not of a legislative nature; therefore they cannot create obligations on the regulated persons, who may decide to show compliance with the applicable requirements using other means. However, as the legislator wanted such material to provide for legal certainty and to contribute to uniform implementation, it must commit competent authorities so that regulated persons complying with an Agency AMC must be recognised as complying with the law. This is the reason why the adoption of such material by EASA is subject to an open rulemaking process as prescribed by Article 52 of the Basic Regulation.

Regulated persons may propose an alternative means of compliance (Alternative Methods of Compliance – AMOC) to the Agency AMC to their competent authority, and, provided they can demonstrate that an equivalent level of safety to that established by the Agency AMC can be ensured, the competent authority may approve such alternative means of compliance. It is important to note that this approval will be granted on an individual basis. Other applicants wishing to make use of the same alternative means of compliance must

obtain individual approval for that from their competent authority. The burden of proof of compliance fully rests with the applicant.

EASA has developed and implemented the Agency's Internal Certification Working Procedures in the following areas: Type Certification, ETSO-Authorisation, Supplemental Type Certification (STCP) and Continuing Airworthiness of Type Design (CAP) (see Appendix B.1).

4.2 Aerodromes

Aerodromes related regulations are the only few in Europe not covered by the EASA competence at the moment. Although European Commission regulation 1108/2009 extends the EASA remits to include also the aerodrome domain, this has not yet leaded to regulations. Probable date is 2013/2015. Accordingly, they are still regulated by ICAO (International Civil Aviation Organisation) international agreements issued in form of Annexes. Non-regulatory character of the organisation (only standards provider), as well as lack of tools ensuring effective and proper execution of issued SARPs, results in large diversity in implementation degree amongst European airports. Therefore aerodromes were considered the most weighted domain in terms of degree of regulation implementation across Europe.

As it was mentioned currently Annex 14 together with related manuals and guidance materials stands as the only and direct set of requirements and recommendations (strictly - SARPs – Standards and Recommended Practices) concerning aerodromes design and functionality issues. Translated into national regulations those standards and recommended practices are applied in about 190 countries around the world including EU-27 + 4. In regard to inconsequent trend of widening the competence of the main European aviation regulator – EASA revision of Annex 14 provisions from the potential improvements point of view was held. The conclusions are included in Research Report EASA.2008/9 titled: *"Studies on the state of the implementation of the provisions contained in ICAO Annex 14 on Aerodromes in the EASA Member States"[3]*. This document is considered as main source for conclusions on this part of the analysis and simultaneously it indicates on potential changes in future aerodromes regulations in the European Union.

In accordance with information included in the document its main purpose is:

- Investigation of Annex 14 implementation status in EASA Member States,
- Investigation of SMS implementation status in EASA Member States,
- Investigation of airport certification in EASA Member States,
- Visit of 56 aerodromes in order to assess the level of conformity to ICAO Annex 14 requirements and status of safety certification and SMS implementation;
- The report aiming at good practices and areas for improvement.

Main observations included in the report were:

Not all European international airports are certified under ICAO provisions.

Amongst other extremely varied level of consistency of national regulations with currently valid ICAO Annex 14 was observed. As for the area of SMS implementation there was also an apparent gap between the current situation and best practices in analysed countries.

It is important to note that differences in implementation levels across Europe partly result from different time period that could be used for this process in different MS. In particular young states (especially those located in Eastern Europe established in 1990's) were not able to introduce these basic measures till today. Additional factor influencing efficiency of implementation process is very different form of adopting ICAO Annex 14 provisions to the particular national regulation. In some countries it is proceeded in a very detailed way, by parliamentary legislation process. It usually takes time and in many cases enables political influence. Other states directly incorporate the entire Annex in one single national regulation. In the case of small countries with a very small aviation market an agreement with bigger neighbouring states were sometimes established in order to bring their regulations in the country. Few states have chosen the approach to declare the latest ICAO Annex 14 standards as generally mandatory. Thank to this solution it is not necessary to carry out any additional and often time consuming procedures to implement the ICAO standards. There was also one country with no implementation of Annex 14 at all. It was still an open issue.

Problems with resources.

According to EASA Report finding main reason for actual deviation from Annex 14 regulations is insufficient resources and capacities as well as some kind of grandfathered rights for the airport infrastructure. There were also problems with publication of actual deviation in the respective AIP. There were no examples of satisfying solutions anywhere in EU.

CAA staff problem in many countries.

Staff shortages, or in other words overworking, lead to common delay in implementation in many countries (especially, if NAAs/CAAs employees are involved in regulatory and legislative processes).

Not all standards and recommendations are fulfilled among aerodromes surveyed in EASA Report.

For example at 7 from 56 visited airports Standards and at 34 Recommendation concerning RESA (Runway End Safety Area) were not fulfilled.

It seemed that many tools allowing efficient execution of required SARPs result with the situation that implementations entailing necessity of conducting of high investment were at least postponed and in many cases abandoned due to lack of financing.

The general situation in terms of compliance with the ICAO requirements is evaluated by the authors of EASA Report as *"satisfactory"*. Nevertheless there is much to be improved although it has to be said also that incompliances in many cases resulted from economic or technical reasons.

Main areas of incompliances can be depicted with two graphs presented below.

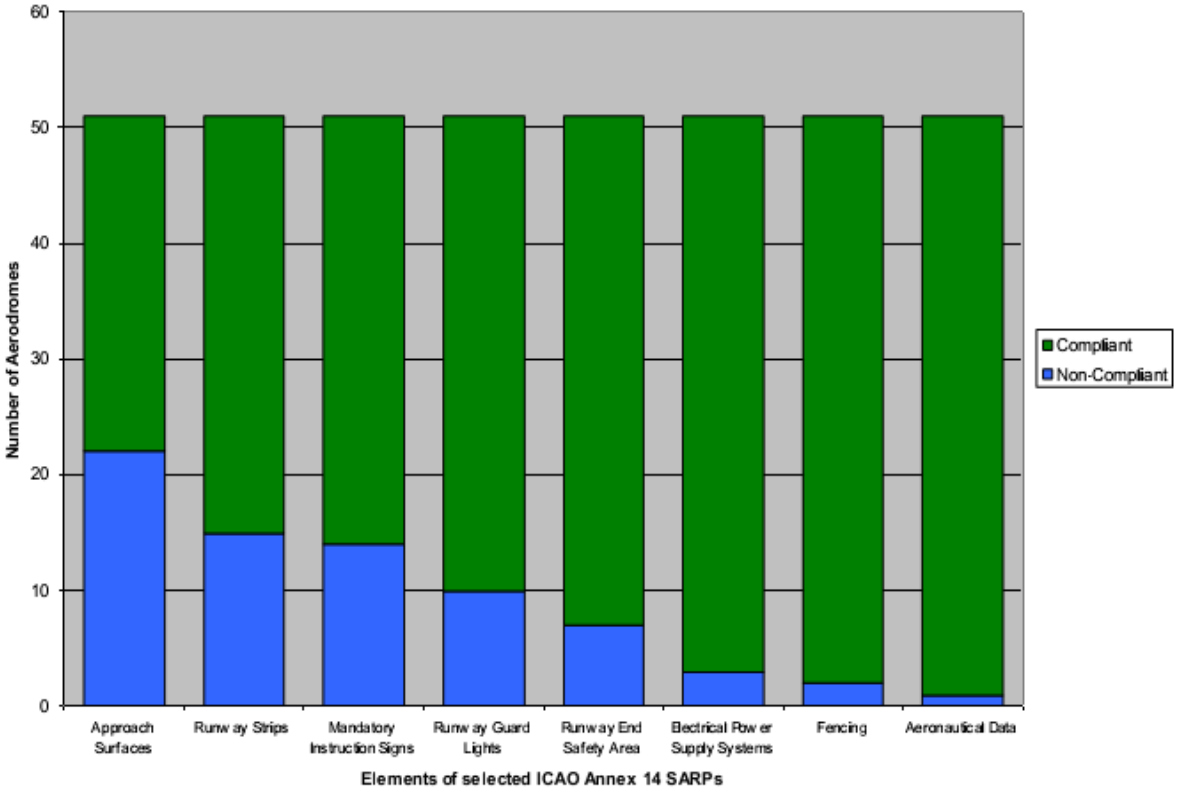

Figure 17: Infrastructure Compliance to ICAO Standards at Medium and Large Aerodromes

Source: EASA Report [3]

Figure 17 illustrates that the most incompliance concern to approach surface, runway strips and mandatory instruction signs. The less deviation can be found in electrical power supply system, fencing and aeronautical data. In terms of recommended practices the deviation is significantly larger. Incompliances concerning RESA - Runway End Safety Area difference from the prescribed model were observed on majority of evaluated airports. Better situation is with regard to Runway Guides lighs and taxiways. Electrical power supply system and width of runway are mostly sticking to recommendations.

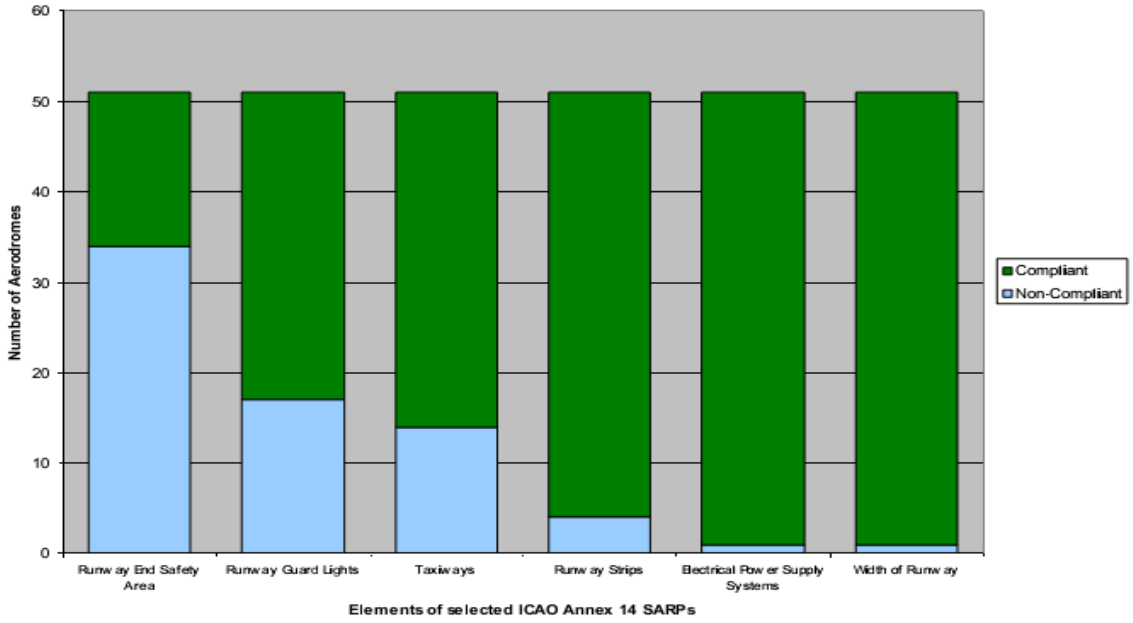

Figure 18: Infrastructure Compliance to ICAO Recommendation at Medium and Large Aerodromes

Source: EASA Report [3]

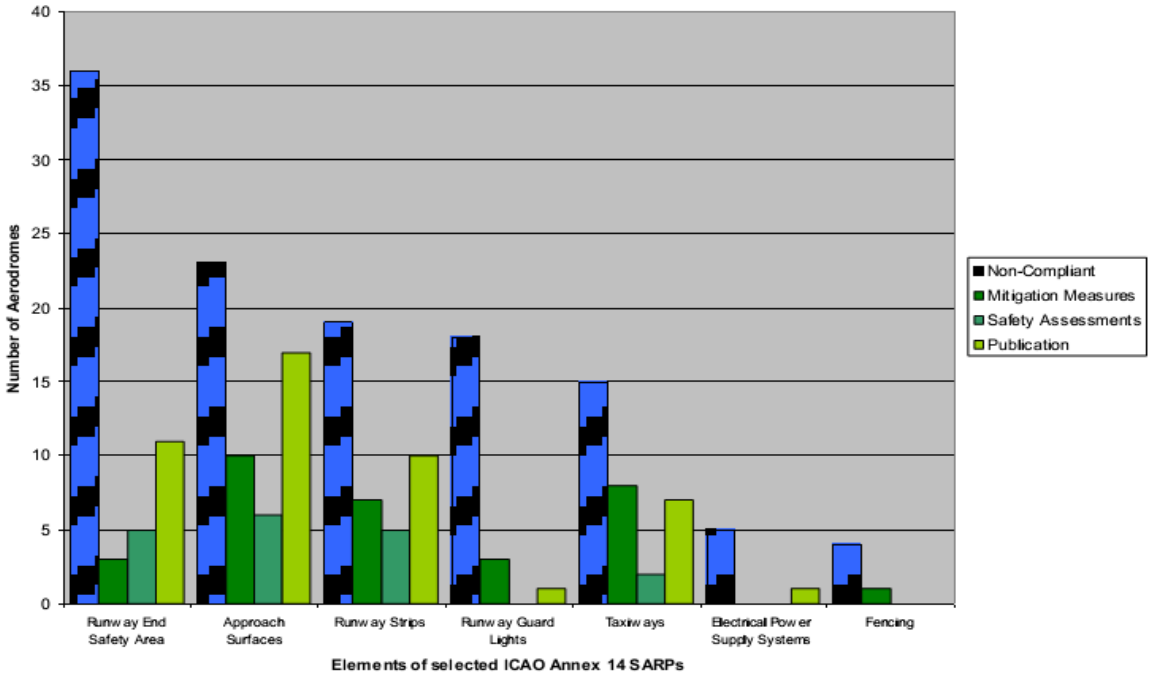

Figure 19: Number of Non-Compliant infrastructural elements to ICAO Recommendations or Standards and associated actions at Medium and Large Aerodromes

Source: EASA Report [3]

In terms of reaction of airports on incompliance to ICAO SARPs there are various situations. It is observed that mitigation measures are applied predominantly in case of deviations concerning approach surface and taxiways. Together with runways strips and RESA incompliances these are the most common published deviation to AIP. Elements related to approach and runway and taxiways qualities are considered as most critical for the safety of operation therefore also safety assessments are conducted for them the most frequently. As least weighted for providing operation on sufficient safety level are considered question related to electric system, fencing or runway guard lights. Despite the fact that there are many deviations observed for this infrastructure components there is also very visible lack of any risk assessment and/or safety compensation/risk mitigation/risk reduction devoted activities or corrective actions.

Results included in mentioned report concern also implementation of Safety Management System throughout industry. In few words it can be claimed that SMS implementation level among EU Member States (source: EASA Final Report) is very heterogeneous and in many cases on unacceptable level. In many countries necessity of parliamentary legislative procedures which take time resulted with lack of implementation of SMS till now. Implementation processes start late mainly due to lack of national standards. There is a considerable need for clear, detailed and proportionate specification regarding SMS airport/aerodrome standards. There is very similar or even worse situation – comparing to the overall aviation industry - in terms of Safety Management System implementation at European Airports. Safety Management Systems are established in a very different ways amongst them. The main reasons are very similar to those mentioned earlier.

In the beginning it is worth to bring the definition of Safety Management System. According to the definition delivered by European Commission[2] Safety Management System should be understood as *"pro-active system that identifies the hazards to the activity, assesses the risks those hazards present, and takes action to reduce those risks to an acceptable level. It then checks to confirm the effectiveness of the actions. The system works continuously to ensure any new hazards or risks are rapidly identified and that mitigation actions are suitable and where found ineffective are revised."*

Requirement included in documents issued in the framework of ICAO legislation impose on every contracted State obligation to implement its own State Safety Program (SSP). State Safety Program is a kind of overarching "chapeau" for all Safety Management Systems established by the industry in the particular State – but in Europe we have to take into account also the European dimension – European Aviation Safety Programme and Plan – as many traditional national prerogatives, duties and responsibilities where moved to the EC and EASA (big part of rulemaking, certification etc.). Contained in cited sources conclusions and observations undoubtedly indicate on the fact that documents and requirements delivered by ICAO are too general to

[2] COMMUNICATION FROM THE COMMISSION TO THE COUNCIL AND THE EUROPEAN PARLIAMENT Setting up an Aviation Safety Management System for Europe

ensure uniform and homogenous implementation on all airports. Especially if airports are variously organized, i.e. multi-airport operator or in case of third party involvement in the system.

Nonexistence of comprehensive guideline for implementation of SSP results with lack of national regulations imposing necessity of introductions such systems (like SMS) in most of the considered countries. And this results, in turn, with very poor, or in many cases complete lack of, implementation of any Safety Management Systems on airports. There are also a few good examples to follow with fully evaluated and matured solutions in this area but on the other hand airports which decided to develop an SMS voluntarily due to purely image- and marketing-related reasons can also be found.

More detailed description of implementation of key elements of SMS amongst Member States is presented below. Observation based on previously mentioned EASA Report[3] are as follows:

- **Safety policy**

  There are only few countries providing to their aviation industry (airports included) comprehensive rules containing necessary details, declaration of *no-blame-culture* and need for *non-punitive reporting system* or rather the one basing on Just Culture principles. There is also unclearness in terms of staff accountability and who should be responsible for Safety Management System introduction and day-to-day work at the airport. The actions taken on the pan-European level during the development of the proposal for a new regulation on aviation occurrences reporting and their ineffectiveness in terms of a total lack of harmonisation between national judicial authorities on the gross-negligence definition which would be applicable during possible criminal proceedings shows how difficult this problem really is. The good thing is that at least as in the present draft format the aforementioned proposal introduces the uniform and standard interpretation of gross-negligence and Just Culture principles on the level of employer-employee relations.

- **Internal Reporting System**

  The problem of non-discriminating and anonymous reporting system is often neglected in the SMS practical implementations. Especially if SMS related regulations are not sufficiently developed as a whole. There is also a problem with clear legal guidelines on implementation of rules ensuring anonymity / misidentification or no-blame culture vs. Just Culture. Only in four Member States authorities handle an internal reporting system providing access to everyone and enabling the authority to preventatively react. However Mandatory Occurrence Reporting Systems are established in 23 EASA States. And there is also

[3] EASA Report 2008/9 Studies on the state of the implementation of the provisions contained in ICAO Annex 14 on Aerodromes in the EASA Member State.

EASA's Internal Occurrence Reporting System – IORS, which is more dedicated to technical part of safety-related events.

- **Systematic hazard identification and risk assessment and mitigation**

Mostly there are only basic statement concerning the need for activities of such types without any detailed information or procedures. If there is any necessity for the analysis most of the Airport operators relies on ANSP or an external specialized entity.

- **Management of temporary change**

Existing ICAO guidelines and manuals do not provide sufficient and comprehensive information enabling easy implementation of temporary change management process. On the other hand we cannot see much done in that area by EC or EASA as well.

- **Internal safety audits**

The obligation of establishing internal audit processes is an effect of ICAO provisions. And this component can be found in many Member States regulation as it was mostly already introduced together with the Quality Systems. Nevertheless, in this matter there is a lack of more detailed guidelines as well.

- **Safety analysis capability, safety performance monitoring and safety promotion and training**

There are just a few examples of this component of Safety Management Systems at aerodromes known to the authors of this report – and none of them complete and throughout.

Short conclusion concerning aerodrome Safety Management Systems in Europe

Due to meeting the limits in human performance in terms of safety management in traditional way ICAO in Doc 9859 – safety management manual indicated on necessity of different, more systemic, proactive and evidence based approach to the issue of safety and risk management. According to SARPs included in the document the implementation of Safety Management System is becoming necessity. Establishing of "European Aviation Safety Programme" (EASP) was a consequence of mentioned state. As it is mentioned above, every Member State is obliged to implement his own State Safety Program SSP. Currently being developed European Aviation Safety Program aims, among others, at supporting States in developing SSPs. One of the most crucial obstacles in SMS introduction process is occurrence reporting and use of European Central Repository. The problem is also called in mentioned above report of EC[1] where incomplete and of low quality data, insufficient clarity in reporting obligations and in the flow of information as well as legal and organizational difficulties in access to ECR are pointed as serious obstacles limiting the usefulness of occurrence reporting and consequently accident prevention purposes. These are not all imperfections disabling desired functioning of

Safety Management System. This is also fragmentation within the current repository system (with two different bases of EUROCONTROL and EASA) and, what is worth emphasizing, difficulties in capturing all occurrences mostly due to not implemented "just culture" approach in decision making.

4.3 ATM Regulation Implementation

Some aspects highlighted in [3] "EUROCONTROL Report on the SES Legislation Implementation (Ed 1.1 19th June 2012)" should be taken into consideration. This report gives the feedback of application of Implementing rules and the related issues.

- **Certification and designation of ANSPs**

SES requires that ANSPs are certified and designated to provide certain services. If the report considers that the certification of ANSPs and training providers as well as the designation of ATSPs is mature, however there is a *growing issue with the certification and designation of AFIS providers*.

- **On-going compliance**

A more consistent approach is needed to define risk based approach for establishing the inspection programme from NSAs.

- **Safety assessment of changes**

Even some improvements have been performed during the last three years some issues remain regarding safety oversight of changes by NSAs. They should use the appropriate material from EASA (EASA Safety Assurance Task Force and NSA Coordination Platform to harmonise their approach to safety oversight of changes.

- **Interoperability Regulation and Implementing Rules**

Although there are nine Implementing Rules of the interoperability Regulation only three (initial flight plan, air-ground voice channel spacing and allocation and use of Mode S interrogator codes) should be implemented in their entirety. All the others have at least one effective date beyond the end of the current reporting period. However the process has been supported by the development of detailed guidance material by the Conformity Assessment Task Force (CATF) and the NSA Coordination Platform.

Regulation	Applicability	Implementation Status
COTR Regulation (EC) No 1032/2006 on exchange of flight data between ATC units (Amended by Regulation (EC) No 30/2009)	1 January 2009 to all EATMN systems referred to in Article 1(2) put into service after that date in respect of the revision of coordination, the abrogation of coordination, the basic flight data and change of basic flight data process 31 December 2012 to all EATMN systems referred to in Article 1(2)	• ANSPs have implemented **47%** • Implementation before Dec 2012 **39%** • Implementation after Dec 2012 **5%** • No plan reported **9%**
Regulation (EC) No 1033/2006 on procedures for flight plans in the pre-flight phase (Amended by Regulation (EU) No 929/2010)	1 January 2009 for implementation of the ICAO provisions as specified in the Annex of Regulation (EC) No 1033/2006 15 November 2012 for implementation of ICAO provisions as specified in Article 1 of Regulation (EU) No 929/2010	No significant issues were reported by the States;
Regulation (EC) No 633/2007 on flight message transfer protocol for use by ATC units (Amended by Regulation (EU) No 283/2011)	1 January 2009 to all systems referred to in the regulations put into service after that date 20 April 2011 to all systems in operation by that date. 31 December 2012 or 31 December 2014 under certain conditions defined by Regulation (EU) N0 283/2011.	24 ANSPs -> compliant 5 --> no compliant
Regulation (EC) No 1265/2007 on air-ground voice channel spacing in SES	15 March 2008 for aircraft operators to equip their aircraft with 8.33kHz radio equipment 3 July 2008 for ANSPs to convert all 25 kHz VHF assignments to 8.33kHz for sectors with a lower level at or above FL195 and for State aircraft to be equipped with 8.33kHz channel spacing capability	24 ANSPs -> compliant 5 --> no compliant
Regulation (EC) No 29/2009 on Data link services for the Single European Sky	Aircraft Forward fit: 1 January 2011 Aircraft Retro fit: 5 February 2015 Ground systems Part A 7 February 2013 for 10 ANSPs Ground systems (Part B 5 February 2015 for 4 states identified	plans for implementation reported by the ANSPs show a high risk for delay
Regulation (EC) No 262/2009 on allocation and use of Mode S interrogator codes	Article 3 (Interoperability and performance requirements) apply from 1 January 2011, other Articles apply from 19 March 2009	A majority of states have taken the measures to be compliant with this regulation. However when considering the answers provided by the States there seems to be a good degree of confusion about the roles and responsibilities of States, Mode S operators and the centralized allocation service with respect to implementing and verifying compliance with this Regulation.

Regulation	Applicability	Implementation Status
Regulation (EC) No 73/2010 on the quality of aeronautical data and aeronautical information	1 July 2013, some Articles applying from 1 July 2014	No data
Regulation (EU) No 1206/2011 on aircraft identification for surveillance	From beginning of 2012	No data
Regulation (EU) No 1207/2011 on performance and interoperability of surveillance	From beginning of 2012	No data

Table 4-1 Current status of SES Interoperability implementation (source [3])

As mentioned in [3] *"…The level of compliance with the IOP implementing rules and the level of supervision put in place by the NSA can still be seen as disappointing. The timely introduction of datalink services through the provisions of the DLS IR is an essential element of securing the SESAR baseline and test of States, ANSPs and the interoperability Regulation ability to deliver synchronised deployment. The evidence from the SES Reports and LSSIP is not encouraging and further action is required. Indeed the evidence suggests that overall more efforts are required to ensure timely compliance with the interoperability Implementing Rules – in particular as the SESAR deployment phase begins. All States and NSAs should take additional steps to ensure that national obligations placed on ANSPs are met in a timely and efficient manner….*

….The responses provided in the States' Annual safety reports still show major differences in the understanding and interpretation of the interoperability Regulation and, notably, of its implementing Rules, which may seriously hinder the harmonised implementation and ultimately the essential objective achieving interoperability within the European ATM Network and the harmonised introduction of new concepts of operations and technologies…"

- **Recommendations:**
  - NSA should take measures to ensure that the regulated parties within their responsibilities implement the interoperability Regulations within the appropriate timeframes (applicable for all states),
  - There is a need to create a framework to allow the sharing of best practices and the provision of support to the states having difficulties in the implementation of interoperability regulation and of its implementing rules. This support should be promoted.

4.4 Software Safety considerations (Total Aviation System)

In the airborne domain, Equipment Software certification usually follows RTCA DO-178C/EUROCAE ED-12C. EASA recognised this standard in accordance with AMC20-115C.

In the ground equipment domain, the applicable regulation for Software Safety Assurance is EC482/2008. Eurocae documents ED153 and ED109 are used as standards. As mentioned in [3], compliance with the software safety assurance system is a cause for concern. The analysis suggests that only 16 of the 35 States considered are fully compliant whereas full compliance should have been achieved by July 2010. Material is available from EUROCAE and EUROCONROL to support ANSP compliance but little exists to support NSAs for oversight of the Regulation.

ANSPs can make use of the available guidance material (e.g. EUROCAE ED-153 - Guidelines for ANS Software Safety Assurance) and training initiatives (e.g. IANS course SAF-SW on ATM Software Safety Assessment) to ensure that enough personnel acquires the required level of expertise . A working session was held in September 2011 in Bled/Slovenia on "Software Assurance Systems & Degraded Modes of Operations". Experts from 28 ANSPs, EUROCONTROL, and EASA were in attendance,

The seminar gave an opportunity to see how ANSPs and manufacturers are tackling the issue, how they are supporting each other in building the software assurance, what standards are available to be used and what training can be followed. The experts also discussed degraded modes of operation project findings issues, e.g. ANSPs expectations from manufacturers and vice versa, building of seamless interfaces between sub-systems, engineering training facilities, difference between redundant and fall-back systems.

The conclusion of the workshop highlights the following points:

1. Manufacturers have a tailored approach to cope with various depth of requests and complexity of ANSPs;
2. ED153 and ED109 the most frequently mentioned – but they are still at very high level;
3. How should safety requirement issued from the IRs be considered in the global system/equipment safety assessment?
4. How can we get a better/common (ANSP/Manufacturer) view of what we really need to do to show compliance to EC482?
5. What should be the content of EC 552 declaration of conformity in relation with safety assessment?
6. COTSs (do we have enough in GM, EDs etc.)?

5 Identification of shortcomings and bottlenecks

Objective of this section is to identify shortcomings and bottlenecks in regulations and certification processes, by considering:

- A further analysis of the classes of safety occurrences that were selected in Section 3,
- The degree of implementation of the regulatory material by considering its implementation level per domain, for which input was collected in Section 4.

Combining these two "dimensions" aims at identifying in priority some necessary areas of improvement in terms of shortcoming and bottlenecks of the current regulation and certification process.

5.1 Overview of the approach

In the context of total aviation system, the objective is to capture relevant data from safety occurrences reporting (EASA, EUROCONTROL SRC) in order to better understand the potential influence of regulatory material and its implementation level regarding these situations. The adopted approach is structured according to the following steps:

- STEP 1 Select Safety occurrences scenarios:
  - **(criteria N° 1) -->** consider the severity of safety occurrences: accident, serious incident (severity A),
  - **(criteria N° 2) -->** consider the quantitative evolution of these occurrences (select occurrences categories if there is no improvement for recent years (e.g. number of occurrences absolute or relative),
  - select scenarios and related occurrences types in order to assess their importance (high, medium) by combining criteria N°1 and criteria N° 2 according to the following rules:
    - Importance of scenario High --> if criteria N°1(OK) AND criteria N°2 (OK),
    - Importance of scenario Medium --> if criteria N°1 (OK) OR criteria N°2 (OK),
- STEP 2 Based on selected set of safety occurrences, identify related main involved regulatory material:
  - describe safety occurrences in more details,

- identify potential precursors and related causes according to the previous set of selected scenarios and related safety occurrences, [use some inputs from Accident/Incident models (e.g. CATS, IRP)] in order to highlight involved operations & systems
- consider occurrences figures related to ATM support functions [5] (SRC Annual safety report 2012)
- consider phases of flight related to safety occurrences scenarios,
- identify level of contribution of each regulatory domain

The expected outputs should be the list of involved regulatory material consolidated with the related phases of flights, the list of main precursors (and potential causes if possible)

- STEP 3 Initial Assessment of the influence of Regulation: identification of shortcomings and bottlenecks by taking in consideration for each safety occurrence scenario (CFIT, SMI, ….) the degree of implementation of involved regulatory materials, the number regulatory domains (ATM, Airworthiness, Flights Operations….) and phases of flights:

  - Very High Priority (shortcoming & bottleneck) if:
    - The safety occurrences scenarios induced in the scope of the regulatory domain are high (accident/ incidents severity A),
    - The interaction with the other regulatory domains is very important in the analysis of safety occurrences scenarios.[4]
    - The identified regulatory area is not implemented at the expected level (whatever the reason).
  - High Priority (shortcoming) if:
    - The safety occurrences scenarios induced in the scope of the regulatory domain are high (accident/ incidents severity A),
    - The interaction with the other regulatory domains is important in the analysis of safety occurrences scenarios.
    - The degree of regulation application is at the expected level,

[4] These criteria (safety occurrences scenarios and interaction with other regulatory domains) are combined in order to assess the level of safety risks in the diagram

- Medium Priority (bottleneck) if:
  - The safety occurrences scenarios induced in the scope of the regulatory domain are medium (not explicitly related to safety occurrences (accident/ incidents severity A).
  - The interaction with the other regulatory domains is less important in the analysis of safety occurrences scenarios.
  - The identified regulatory area is not implemented at the expected level (whatever the reason).
- Satisfactory if:
  - The safety occurrences scenarios induced in the scope of the regulatory domain are medium (not explicitly related to safety occurrences (accident/ incidents severity A).
  - The degree of regulation application is at the expected level,

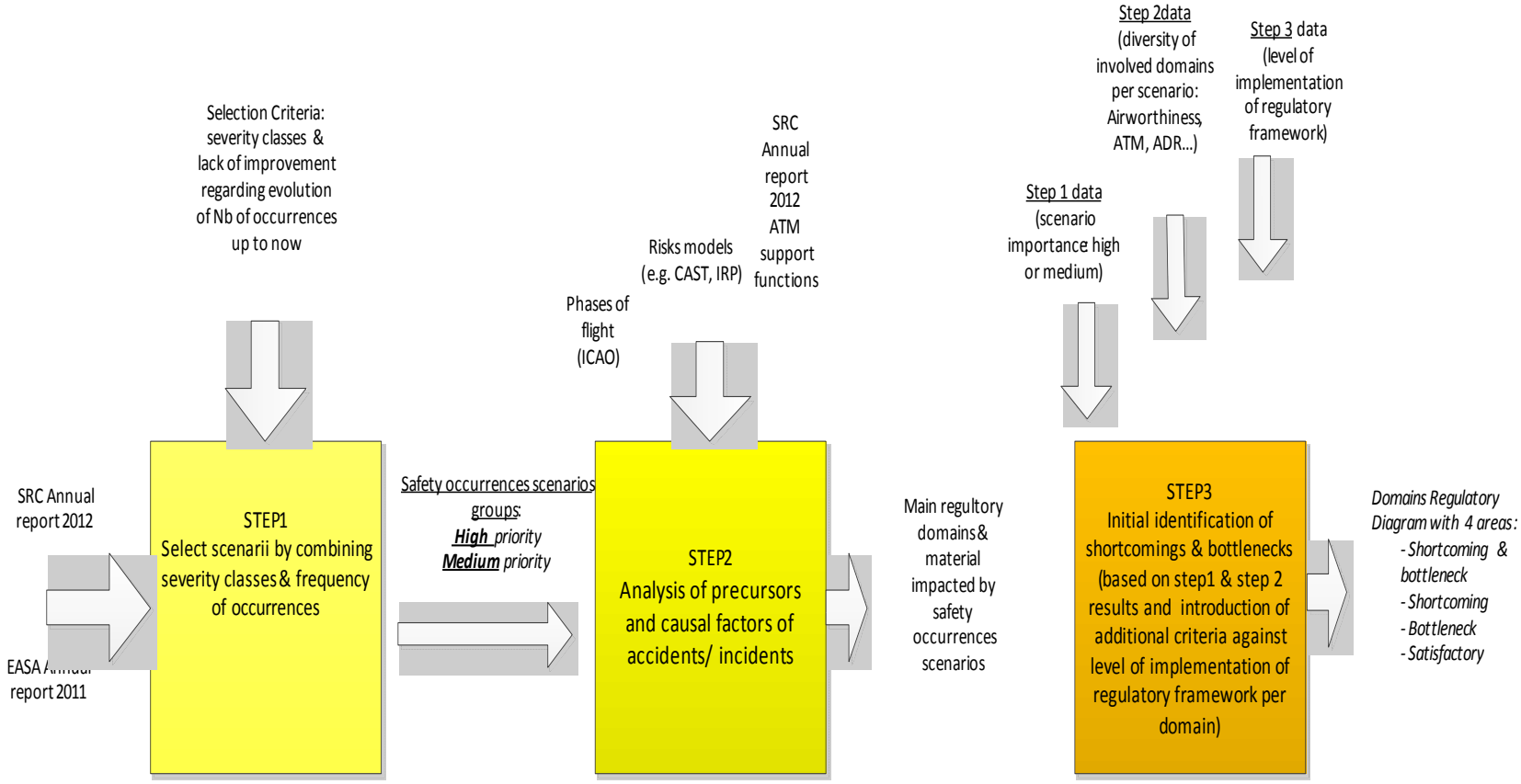

Figure 20 Overview of the approach (steps 1, 2 and 3)

- STEP 4 Additional considerations: based on similar analysis [7] (FAA Commercial Airplane Certification Process Study (March 2002) or [6] (EASA RIA Process definition) some relevant inputs should be considered to improve the characterisation of shortcomings or bottlenecks.

Figure 21 STEP 3 Safety occurrences analysis- Generic diagram of shortcoming/ bottleneck determination

5.2 (STEP1) Use of safety occurrences analysis

The importance of scenario is depending on the application of the both criteria: severity of the safety occurrences (severity A) and/ or stagnation regarding the improvement of these situations up to now.

Importance of scenario	Accident/ Incident	Sources	Comments
High	LOC-I (Loss Of Control in Flight)	EASA Annual safety review 2011	2002-2011 Highest number of fatal accidents in the decade for CAT (Commercial Air Transport) *Figure 6* Annual proportion from all accidents in percentage of LOC-I accidents is increasing from 2008 *Figure 7*
High	CFIT (Controlled Flight Into Terrain)	EASA Annual safety review 2011 *Figure 6*	2002-2011 Highest number of fatal accidents in the decade for CAT (Commercial Air Transport)

Importance of scenario	Accident/ Incident	Sources	Comments
High	RE (Runway Excursion)	EASA Annual safety review 2011 [*Figure 8 & Figure 9]*	Runway Excursions: no real improvement from 2007 for Accidents (phases of flight landing & take-off) increase of incidents from 2008 (partially due to improvement of safety occurrences reporting): phases of flight landing & taxi
High	UAP (Unauthorised penetration of airspace or airspace infringements)	EASA Annual safety review 2011 [*Figure 11 & Figure 12*] SRC Annual safety report 2012 [*Figure 14*]	Many of these incidents are also categorised as SMI (in the causal chain) - Small increase of incidents severity A in 2012 (0,2%) Considerable increase in 2011 (in terms of absolute number (4 to 12) An improvement is needed - increased number of safety occurrences not classified in terms of severity.
High	SMI (Separation Minima Infringement)	EASA Annual safety review 2011 *Figure 11 & Figure 12* SRC Annual safety report 2012 [*Figure 14*]	Increase every year (except 2009-2010) –largest proportion Incidents severity A (from 16 to 35) & B (from 178 to 217) The increase shown in 2011 is quite substantial An improvement is needed - increased number of safety occurrences not classified in terms of severity.
Medium	CLR (aircraft deviation of ATC clearance including Level Bust)	EASA Annual safety review 2011 *Figure 11 & Figure 12* SRC Annual safety report 2012[*Figure 14*]	Many of these incidents are also categorised as SMI (in the causal chain) An improvement is needed - increased number of safety occurrences not classified in terms of severity.
Medium	RI (Runway Incursion)	EASA Annual safety review 2011 *Figure 11 & Figure 12* SRC Annual safety report 2012 [*Figure 14*]	Occurrence rate increases in 2010 (although an improvement in 2011: 23 serious in 2011 compared to 22 in 2010 and 62 major in 2011 to 77 in 2010) An improvement is needed - increased number of safety occurrences not classified in terms of severity.
Medium	IS (Inadequate Separation)	SRC Annual safety report 2012 *Figure 14*	An improvement is needed - increased number of safety occurrences not classified in terms of severity.

Table 5-1 STEP 1 Summary of Scenarios assessment with Safety occurrences analysis

5.3 (STEP2) Analysis of precursors and causal factors of accidents/ incidents

5.3.1 Describe safety occurrences in more details (source [12] Skybrary portal)

5.3.1.1 LOC-I Loss of Control In Flight

LOC-I as mentioned in [2], Loss of control in flight is an extreme manifestation of a deviation from intended flight path. The phrase “loss of control” may cover only some of the cases during which an unintended deviation occurred.

In terms of analysis of this safety occurrence, some clarifications are provided in [2]:

- Used only for airborne phases of flight where aircraft control was lost.
- Loss of control can occur during either Instrument Meteorological Conditions (IMC) or Visual Meteorological Conditions (VMC).
- The loss of control during flight may occur as a result of a deliberate manoeuver (e.g., stall/spin practice)
- Occurrences involving configuring the aircraft (e.g., flaps, slats, on-board systems, etc.) are included.
- Stalls are considered loss of control and are included here.
- Includes pilot-induced or assisted oscillations.
- For icing-related events, which are also loss of control, code both LOC–I and ICE).
- If the loss of control is a direct result of a system/component failure or malfunction (SCF), code the occurrence as an SCF–NP, or SCF–PP only. However, loss of control may follow less severe system/component failures, and in this case, code both categories.
- Cockpit crew vision-related events and flight in degraded visual environments (for example, obscuration, black hole approach events, brownouts, or whiteout events), where the aircraft is flown under control into terrain, water, or obstacles, are coded under CFIT, not LOC–I.

5.3.1.2 CFIT (Controlled Flight Into Terrain)

Controlled Flight into Terrain (CFIT) occurs when an airworthy aircraft under the complete control of the pilot is inadvertently flown into terrain, water, or an obstacle. The pilots are generally unaware of the danger until it is too late. Most CFIT accidents occur in the approach and landing phase of flight and are often associated with non-precision approaches. Many CFIT accidents occur because of loss of situational awareness, particularly in the vertical plane, and many crash sites are on the centreline of an approach to an airfield. Lack of familiarity with the approach or misreading of the approach plate are common causal factors, particularly where the approach features steps down in altitude from the initial approach fix to the final approach fix.

5.3.1.3 RE (Runway Excursion)

A runway excursion (A veer off or overrun off the runway surface) occurs when an aircraft departs the runway in use during the take-off or landing run.

Types of Runway Excursion:

- A departing aircraft fails to become airborne or successfully reject the take- off before reaching the end of the designated runway.

- A landing aircraft is unable to stop before the end of the designated runway is reached.

- An aircraft taking off, rejecting take- off or landing departs the side of the designated runway (for example due to engine failure or steering problem).

The Runway Excursion category includes also two types of occurrences which do not fit the ICAO ADREP definition for a runway excursion, however considered appropriate for inclusion due to the commonality of a number of causal and contributory factors and/or mitigation approaches:

- An aircraft attempting a landing touches down in the undershoot area of the designated landing runway within the aerodrome perimeter;
- A runway or taxiway other than the designated one is used for a take-off or a landing.

5.3.1.4 UAP (Unauthorised penetration of airspace or airspace infringements)

Airspace infringement occurs when an aircraft enters notified airspace without previously requesting and obtaining clearance from the controlling authority of that airspace, or enters the airspace under conditions that were not contained in the clearance.

Notified Airspace includes controlled airspace structures in ICAO airspace classes A to E, such as Airways, Terminal Control Areas (TMAs), Control Zones (CTRs) or aerodrome traffic zones (ATZ) outside controlled airspace, as well as restricted airspaces, such as danger areas, restricted areas, prohibited areas and temporary reserved airspaces (TRA).

It should be noted that VFR traffic cannot infringe class E airspace because under ICAO rules neither an ATC clearance nor radio communication is required to enter or operate within it, unless filed national differences call for one or the other (or both). Traffic following instrument flight rules (IFR) can infringe class E airspace when not in receipt of a clearance to enter it.

Although VFR flights do not require clearance to enter Class E airspace, serious incidents have occurred between VFR and IFR flights in such airspace due largely to limitations in the “see-and-avoid” principle. Therefore this type of incident is also being addressed by airspace infringement prevention initiatives. All classes of aircraft are prone to airspace infringement, but the majority of incidents recorded involve General Aviation. This is not a surprise, as most GA VFR flights are conducted outside controlled areas and zones, and are in general flown by less trained and experienced leisure pilots, whereas IFR flights are usually contained within controlled airspace and carried out under the supervision of ATC units.

5.3.1.5 CLR (aircraft deviation of ATC clearance including Level Bust)

Level Bust is defined as any unauthorised vertical deviation of more than 300 feet from an ATC flight clearance. A Level Bust or Altitude Deviation occurs when an aircraft fails to fly at the level to which it has been cleared, regardless of whether actual loss of separation from other aircraft or the ground results.

A Level Bust can result in Loss of Separation between aircraft or between an aircraft and the terrain or a ground obstruction such as a mast (CFIT).

Level busts are becoming less dangerous because improvements in technology such as better STCA and Mode S have improved the ability of controllers to safely manage any consequent loss of separation. Furthermore, the availability and proper use of ACAS provides a final safety net which significantly reduces the risk of a Mid-Air Collision, and TAWS has also reduced the risk of a level bust resulting in a CFIT accident.

The move to Flexible Use Airspace (FUA), the absence of ACAS on many military aircraft and the high performance of many military jet aircraft, means that the consequences of level busts involving military aircraft are more difficult to manage. A potential loss of separation resulting from the ATCO assigning an inappropriate altitude or flight level in a flight clearance does not constitute a level bust.

5.3.1.6 SMI (Separation Minima Infringement)

A defined loss of separation between airborne aircraft occurs whenever specified separation minima in controlled airspace are breached. Minimum separation standards for airspace are specified by ATS authorities, based on ICAO standards. A loss of separation between aircraft which are responsible for their own separation by visual lookout is not subject to definition. Usually, the occurrence of a 'near miss', termed an AIRPROX by ICAO, is defined only by the opinion of one or more of the parties involved, whereas Near Mid-air Collision (NMAC) is an AIRPROX that meets specified criteria. The different types of loss of separation are:

- Loss of separation may be either in a vertical or a horizontal plane, or both;
- Loss of separation between aircraft may be a consequence of a Level Bust;
- Loss of separation between aircraft may result in encounters with Wake Vortex Turbulence;
- Loss of separation from notified airspace is dealt with under Airspace Infringement;
- Loss of separation from the ground is dealt with under CFIT;
- Loss of separation between aircraft on the ground is dealt with under Ground Operations.

5.3.1.7 RI (Runway Incursion)

ICAO defines a Runway Incursion as: "Any occurrence at an aerodrome involving the incorrect presence of an aircraft vehicle or person on the protected area of a surface designated for the landing and take-off of aircraft".

5.3.2 Identify potential precursors and related causes (operations, systems)

The aim of this part of analysis is to better identify the related operations and/ or systems involved in the safety occurrences.

The list of precursors and related causes is not exhaustive; however it gives an idea about the operations and systems at the origin of the safety occurrences.

Importance of scenario	Accident/ Incident	Main Precursors -causes (operations & systems)
High	LOC-I (Loss Of Control in Flight)	Pilot induced Icing related events Aircraft System component failure Degraded visual environment IMC (Instrument Meteo Control) Poorly designed Human Machine Interface
High	CFIT (Controlled Flight Into Terrain)	Pilot trajectory deviation (use incorrect data, wrong altimeter data setting, misjudgement) FMS/ RNAV/ Flight Control Management: * instrument display wrong data * flight director error * autopilot error * airborne altimeter error * Navaid error causes deviation * landing signal error causes deviation (MLS/ ILS) * GBAS error causes deviation ATC Flight trajectory management * inadequate communication with crew * altimeter setting sent by ATC * ATCO coordination * ATCO instruction (misjudgement of terrain separation) * no radar surveillance or insufficient picture * unclear instruction Route/ procedure design * route/ procedure design * route/ procedure publication Inadequate Flight crew monitoring A/C Ground proximity warning (TAWS/ GPWS) ATCO monitoring +MSAW * safety net MSAW failure * inadequate traffic picture * inadequate transmission of instructions
High	RE (Runway Excursion)	* Aircraft system malfunction (e.g. nose wheel steering or engine malfunction) * Reported wind velocity or runway surface conditions differ from actual conditions; * significant Aquaplaning occurs * A departing aircraft fails to get airborne before end of the runway * A landing aircraft is unable to stop before end of runway (weight, system failure...)

Importance of scenario	Accident/ Incident	Main Precursors -causes (operations & systems)
High	UAP (Unauthorised penetration of airspace or airspace infringements)	Bad AIS causes Pilot error causes Bad coordination causes No alert by ATCO (using safety net APW)
High	SMI (Separation Minima Infringement)	**Precursor: Imminent infringement** Crew/ AC induced conflict management * conflict due to airspace infringement (bad AIS, bad coordination causes, pilot error causes) *conflict due to crew/ AC deviation (e.g. level bust, lateral/ speed/ V. rate deviation, wake, A/C system failure, weather) ATC induced conflict management * trajectory management instruction * inadequate communication to pilot * incorrect timing of instruction (late, early) * bad frequency management * ineffective civil-military coordination Tactical conflict resolution failure * bad transfer of frequency * inadequate traffic picture * ATCO misjudgement of separation * loss of communication * insufficient time to act Reduced Vertical Separation Minima (RVSM) * Failure to comply with RVSM operating procedures (flight planning, pre-flight procedures, prior to RVSM airspace entry, in-flight procedures, post-flight procedures) * equipment failures (failure of all automatic altitude-control systems aboard the aircraft; loss of redundancy of altimetry systems, loss of thrust on an engine necessitating descent or any other equipment failure affecting the ability to maintain cleared flight level).
Medium	CLR (aircraft deviation of ATC clearance including Level Bust)	**Main precursor: Crew/ Aircraft induced conflict** * Levels busts causes - inadequate communication of level/ height to pilot - pilot handling error - altimeter setting error - aircraft technical failure - ACAS RA cause - weather induced level bust * aircraft deviation causes (lateral, speed, vertical speed) - pilot induced (misunderstood ATC instruction, failure to follow ATC - instruction or ATC procedures, emergency situation) - wake induced deviation - aircraft induced deviation (incorrect AIS data, technical failure) Note: The need for good datalink systems to improve the communication of clearances should also be considered.
Medium	RI (Runway Incursion)	ATC instigated Runway Entry incursion * failure to balance operational airport capacity/ demand * tower (runway) failure to balance arrivals or departures * AMAN/ DMAN insufficient spacing * failure in managing sequences * inadequate instruction to pilot * inadequate communication to pilot (loss, failure) * insufficient (use of) ground surveillance * runway status information inadequate * inadequate coordination between tower & apron Non ATC Runway Entry incursion Animal/ Person Runway incursion Premature landing incursion * ATC landing procedures (insufficient spacing, clearance error, inadequate communication with pilot) * Landing without clearance (pilot takes clearance of other aircraft) * Landing on wrong runway (landings aids failure)

Importance of scenario	Accident/ Incident	Main Precursors -causes (operations & systems)
		Premature Take-Off incursion * use of closed runway * failure to recognize availability of runway * inadequate communication with pilot * failure to follow take-off procedures Note: The implementation and requiring of the Runway Awareness and Advisory System (RAAS) could improve the RI situation. RAAS is one of a number of related software enhancements available on later-model Enhanced Ground Proximity Warning Systems. RAAS is designed to improve flight crew situational awareness, thereby reducing the risks of runway incursion, runway confusion and runway excursions.
Medium	IS (Inadequate Separation)	**Main precursor: Planned conflict** * ineffective traffic planning or coordination * inadequate surveillance picture * incorrect trajectory information (planning data) (See also Notes on SMI and RI)

Table 5-2 STEP 2 Main precursors/ causes related to reported safety occurrences to be considered

5.3.3 Occurrences figures related to ATM support functions (origin due to equipment)

Moreover in terms of functions failures, a cross analysis aiming to use some data regarding the evolution of failures of ATM support functions seems relevant to identify areas where there is a particular need of improvement. Regarding the Figure 16 the three categories of functions Communication, Surveillance and Data processing are identified as areas where an improvement of regulatory material and/ or its implementation is needed (shortcoming/ bottleneck).

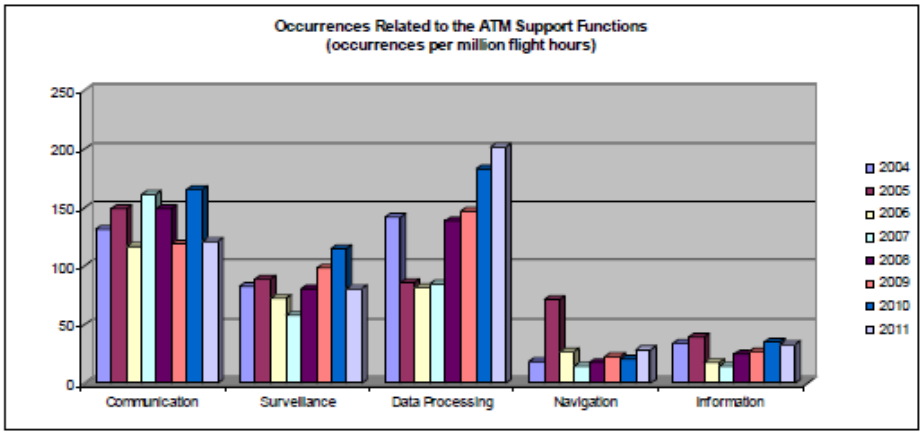

Figure 16 Occurrences Related to the ATM Support Functions (occurrences per million flight hours)Figure 22: Occurrences Related to the ATM Support Functions (occurrences per million flight hours) [source SRC Annual safety report 2012]

In terms of communication these data should include both communications air-ground and ground-ground. In terms of surveillance should be included also radar and ADS-B functions. For data processing functions it should be considered all functions related to:

- Flight Plan management,
- Aeronautical data management and
- Functions related to display operational data to the ATCO.

5.3.4 Consider phases of flight related to safety occurrences scenarios

The set of phases of flight defined in [8] [ICAO CAST Common Taxonomy Team Phases of Flight Definitions and Usage Notes (October 2011)] and considered here are the following:

- Take-off (TOF): From the application of take-off power, through rotation and to an altitude of 35 feet above runway elevation,
- Initial Climb (ICL): From the end of the Take-off sub-phase to the first prescribed power reduction, or until reaching 1,000 feet above runway elevation or the VFR pattern, whichever comes first.
- En Route (ENR):
    - Instrument Flight Rules (IFR): From completion of Initial Climb through cruise altitude and completion of controlled descent to the Initial Approach Fix (IAF).
    - Visual Flight Rules (VFR): From completion of Initial Climb through cruise and controlled descent to the VFR pattern altitude or 1,000 feet above runway elevation, whichever comes first.
- Approach (APR):
    - Instrument Flight Rules (IFR): From the Initial Approach Fix (IAF) to the beginning of the landing flare.
    - Visual Flight Rules (VFR): From the point of VFR pattern entry, or 1,000 feet above the runway elevation, to the beginning of the landing flare.
- Landing (LDG): From the beginning of the landing flare until aircraft exits the landing runway, comes to a stop on the runway, or when power is applied for take-off in the case of a touch-and-go landing.

The weight of phases of flight as mentioned in [8] concerned by the safety occurrences scenarios should give an indication of the main involved regulatory material.

This weight is given in the following Figure 23. These data represent the number of occurrences of flight phases corresponding to the different safety scenarios (e.g. “approach (APR)” is mentioned 6 times for the set of safety occurrences scenarios).

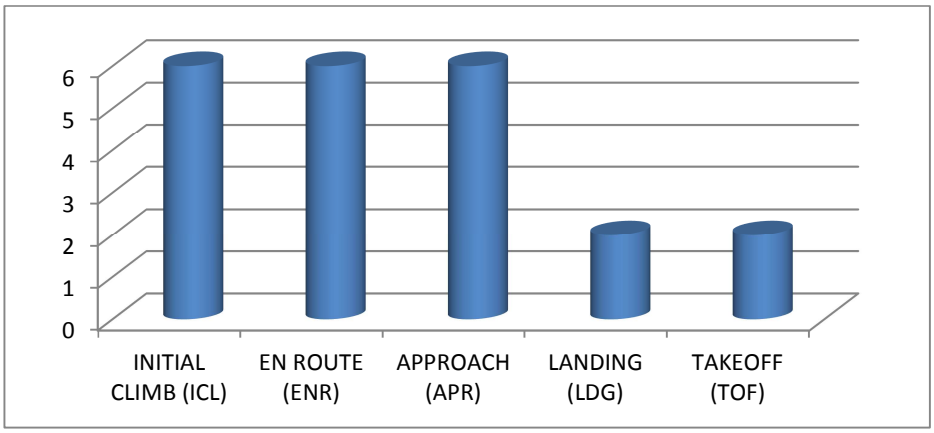

Figure 23 STEP 2 Weight of phases of flight involved in Safety occurrences scenarios

5.3.5 Identify level of contribution of each regulatory domain

5.3.5.1 Potential Contribution of Airworthiness regulatory material

Importance of scenario	Accident/ Incident	Involved regulatory material * Initial airworthiness & continuing airworthiness * safety assessment methodology (ARP 4754, ARP 4761) * SW standards (DO178C)
High	LOC-I (Loss Of Control in Flight)	Aircraft System component failure IMC (Instrument Meteo Control) Application of error –prone solutions in designing of human-machine interface
High	CFIT (Controlled Flight Into Terrain)	*FMS/ RNAV/ Flight Control Management:* * instrument display wrong data * flight director error * autopilot error * airborne altimeter error
High	RE (Runway Excursion)	* Aircraft system malfunction (e.g. nose wheel steering or engine malfunction) * A landing aircraft is unable to stop before end of runway (weight, system failure...)
High	UAP (Unauthorised penetration of airspace or airspace infringements)	*FMS/ RNAV/ Flight Control Management:* * instrument display wrong data * flight director error * autopilot error * airborne altimeter error
High	SMI (Separation Minima Infringement)	**conflict due to crew/ AC deviation* (e.g. level bust, lateral/ speed/ V. rate deviation, wake, A/C system failure, weather) * Failure to properly comply with these regulations

Importance of scenario	Accident/ Incident	Involved regulatory material * Initial airworthiness & continuing airworthiness * safety assessment methodology (ARP 4754, ARP 4761) * SW standards (DO178C)
Medium	CLR (aircraft deviation of ATC clearance including Level Bust)	* Levels busts causes - aircraft technical failure - ACAS RA cause * aircraft deviation causes (lateral, speed, vertical speed) - aircraft induced deviation (incorrect AIS data, technical failure)
Medium	RI (Runway Incursion)	Not applicable
Medium	IS (Inadequate Separation)	* aircraft deviation causes (lateral, speed, vertical speed) - aircraft induced deviation (incorrect AIS data, technical failure) * Failure to properly comply with these regulations

Table 5-3 Contribution of airworthiness regulatory material to safety occurrences scenarios

5.3.5.2 Potential contribution of CNS/ATM regulatory material

Importance of scenario	Accident/ Incident	Involved regulatory material CNS/ ATM * ATM SES IR including SW (EC482) * Safety Assessment Methodology (SAM) * ED78A for communications * SW Standards (ED153-ED109)
High	LOC-I (Loss Of Control in Flight)	Not applicable
High	CFIT (Controlled Flight Into Terrain)	Navigation aids * Navaid error causes deviation * landing signal error causes deviation (MLS/ ILS) * GBAS error causes deviation ATC Flight trajectory management * inadequate communication with crew * altimeter setting sent by ATC * ATCO coordination * ATCO instruction (misjudgement of terrain separation) * no radar surveillance or insufficient picture * unclear instruction Route/ procedure design * route/ procedure design * route/ procedure publication ATCO monitoring +MSAW * safety net MSAW failure * inadequate traffic picture * inadequate transmission of instructions
High	RE (Runway Excursion)	* Lack of awareness of the importance of stabilized approaches * Lack of awareness of stabilized approach criteria * Failure to descend aircraft appropriately for the approach * Failure to allow aircraft to fly appropriate approach speeds * Failure to select the appropriate runway based on the wind * Late runway changes (e.g., after final approach fix) * Failure to provide timely or accurate wind/weather information to the crew * Failure to provide timely or accurate runway condition information to the crew
High	UAP (Unauthorised penetration of airspace or airspace infringements)	Bad AIS causes Bad coordination causes No alert by ATCO (using safety net APW)

Importance of scenario	Accident/ Incident	Involved regulatory material CNS/ ATM * ATM SES IR including SW (EC482) * Safety Assessment Methodology (SAM) * ED78A for communications * SW Standards (ED153-ED109)
High	SMI (Separation Minima Infringement)	*ATC induced conflict management* * trajectory management instruction * inadequate communication to pilot * incorrect timing of instruction (late, early) * bad frequency management * ineffective civil-military coordination *Tactical conflict resolution failure* * bad transfer of frequency * inadequate traffic picture * ATCO misjudgement of separation * loss of communication * insufficient time to act
Medium	CLR (aircraft deviation of ATC clearance including Level Bust)	* *Levels busts causes* - inadequate communication of level/ height to pilot
Medium	RI (Runway Incursion)	*ATC instigated Runway Entry incursion* * failure to balance operational airport capacity/ demand * tower (runway) failure to balance arrivals or departures * AMAN/ DMAN insufficient spacing * failure in managing sequences * inadequate instruction to pilot * inadequate communication to pilot (loss, failure) * insufficient (use of) ground surveillance * runway status information inadequate * inadequate coordination between tower & apron *Premature landing incursion* * ATC landing procedures (insufficient spacing, clearance error, inadequate communication with pilot) *Premature Take-Off incursion* * inadequate communication with pilot
Medium	IS (Inadequate Separation)	*Main precursor: Planned conflict* * ineffective traffic planning or coordination * inadequate surveillance picture * incorrect trajectory information (planning data)

Table 5-4 Contribution of CNS/ ATM regulatory material to safety occurrences scenarios

5.3.5.3 Potential contribution of Flight Standards regulatory material

Importance of scenario	Accident/ Incident	Involved regulatory material * Flight standards/ Air crew (EU) N°1178/ 2011 (e. g. annexes Flight crew licensing)
High	LOC-I (Loss Of Control in Flight)	*Pilot induced LOC-I* * Improper procedure * Spatial disorientation * Improper training * distraction
High	CFIT (Controlled Flight Into Terrain)	*Pilot trajectory deviation:* (use incorrect data, wrong altimeter data setting, misjudgement) *Inadequate Flight crew monitoring*
High	RE (Runway Excursion)	-Rejected take-off (RTO) initiated at speed greater than V1 - Directional control during take-off or RTO is inadequate - RTO before V1 is reached - No rotation because VR not reached - Crew noncompliance with standard operating procedures (SOPs) - Rotation not attempted - Failure of crew resource management (CRM) - Unable to rotate - Aircraft weight calculation error - RTO — no time to abort before veer-off - Rotation above VR (landing)

Importance of scenario	Accident/ Incident	Involved regulatory material * Flight standards/ Air crew (EU) N°1178/ 2011 (e. g. annexes Flight crew licensing)
		- RTO not considered - Pilot technique — crosswind - Failure of pilot-in-command (PIC) supervision of first officer - Improper checklist use - Premature rotation — before VR - Inappropriate touchdown (long, fast, hard, bounce, off-centre) - Approach high - Pilot error (glideslope/altitude control, speed control, crosswind, flare, directional control)
High	UAP (Unauthorised penetration of airspace or airspace infringements)	*Pilot error causes* * Improper procedure * Spatial disorientation * Improper training * distraction
High	SMI (Separation Minima Infringement)	*Crew/ AC induced conflict management:* *conflict due to airspace infringement (pilot error causes) *conflict due to crew/ AC deviation (e.g. level bust, lateral/ speed/ V. rate deviation)
Medium	CLR (aircraft deviation of ATC clearance including Level Bust)	*Levels busts causes* (pilot handling error)/ *aircraft deviation causes* - pilot induced (misunderstood ATC instruction, failure to follow ATC instruction or ATC procedures, emergency situation)
Medium	RI (Runway Incursion)	*Premature landing incursion* (* Landing without clearance (pilot takes clearance of other aircraft) *Premature Take-Off incursion* * use of closed runway * failure to recognise availability of runway * failure to follow take-off procedures
Medium	IS (Inadequate Separation)	*Pilot error causes* * Improper procedure * Spatial disorientation * Improper training * distraction

Table 5-5 Contribution of Flight Standards regulatory material to safety occurrences scenarios

5.3.5.4 Potential contribution of Aerodrome regulatory material

Importance of scenario	Accident/ Incident	Involved regulatory material ADR * ICAO material (annex 14) * Safety Assessment Methodology (SAM) * Eurocae (SMGCS) * ED78A for communications * SW Standards (ED153-ED109)
High	LOC-I (Loss Of Control in Flight)	Not applicable
High	CFIT (Controlled Flight Into Terrain)	* Incorrect or obscured runway markings * Inappropriate obstacle assessments
High	RE (Runway Excursion)	*Runway and airsite conditions compatibility with SARPs* * failure to provide compliant runway surface friction characteristics (wet, flooded runway, covered with snow, slush or ice) * inadequacy of safety areas surrounding the runway * inappropriate RWY and TWY profile and geometry Runways not constructed and maintained to maximize effective friction and drainage * Late or inaccurate runway condition reports * Not closing a runway when conditions dictate

Importance of scenario	Accident/ Incident	Involved regulatory material ADR * ICAO material (annex 14) * Safety Assessment Methodology (SAM) * Eurocae (SMGCS) * ED78A for communications * SW Standards (ED153-ED109)
		* Incorrect or obscured runway markings * Failure to allow use of wind-preferential runways * Inadequate runway end safety area (RESA) or equivalent system * Inappropriate obstacle assessments * No international standard for measuring and reporting runway conditions * Inadequate regulation for the provision of correct, up-to-date and timely runway condition reports
High	UAP (Unauthorised penetration of airspace or airspace infringements)	Not applicable
High	SMI (Separation Minima Infringement)	ATC/ATM error
Medium	CLR (aircraft deviation of ATC clearance including Level Bust)	* Lack of a regulatory requirement to provide flight crews a consistent format of take-off and landing data for all runway conditions
Medium	RI (Runway Incursion)	*ATC instigated Runway Entry incursion* * failure to balance operational airport capacity/ demand * tower (runway) failure to balance arrivals or departures * AMAN/ DMAN insufficient spacing * failure in managing sequences * inadequate instruction to pilot * inadequate communication to pilot (loss, failure) * insufficient (use of) ground surveillance * runway status information inadequate * inadequate coordination between tower & apron *Runway monitoring* * tower visibility * aircraft/ vehicle invisible *Non ATC Runway Entry incursion* * inadequate information for runway exit (e.g. ad/ misleading marking) *Animal/ Person Runway incursion* * inadequate security level *Premature landing incursion* * ATC landing procedures (insufficient spacing, clearance error, inadequate communication with pilot) * Landing on wrong runway (landings aids failure) *Premature Take-Off incursion* * inadequate communication with pilot
Medium	IS (Inadequate Separation)	ATC/ATM error

Table 5-6 Contribution of ADR regulatory material to safety occurrences scenarios

5.4 (STEP3) Initial assessment of the influence of the Regulation

According to the description of the proposed approach, this step is focusing on the combination of several aspects in order to determine the characteristics in terms of shortcoming and/ or bottleneck of the regulatory material.

The assumption is that it is important to take into account the results of application of current regulation (performance aspects by analysing safety occurrences scenarios criticality) but also the interaction of regulatory domains between each other (e.g. Aircraft/airworthiness; Operations and FCL; ATM/ANS; and Aerodromes). For example, if this interaction is high, the need of harmonisation between the domains is more important to control the risks. This assessment is performed by considering the safety occurrences scenarios and related causes.

The details of this initial analysis are given here after:

- Potential contribution of regulatory domains to safety occurrences scenarios: ranking of domains against safety scenarios (high important, medium)

The following data are providing information in order to assess the potential contribution of regulatory domains against safety occurrences scenarios (e.g. number of scenarios covered by each domain).

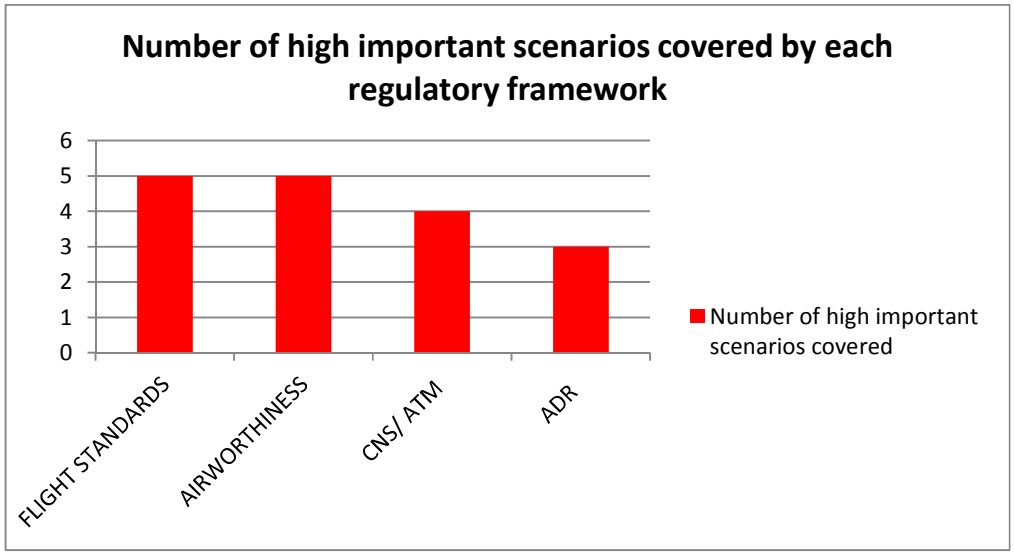

Figure 24 Number of high important scenarios covered by each regulatory framework

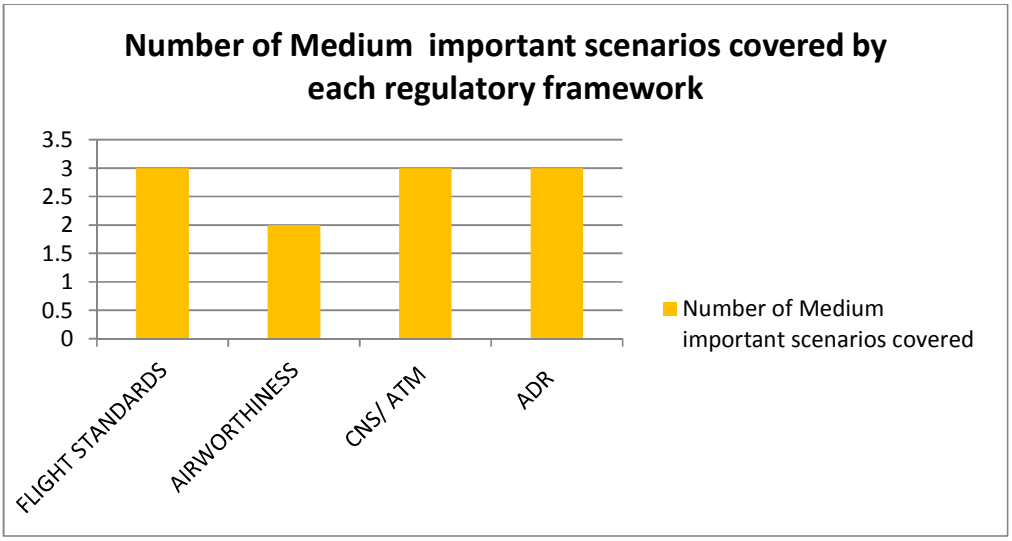

Figure 25 Number of medium important scenarios covered by each regulatory framework

This table is summarising for each domain the set of main types of precursors at the origin of the safety scenarios (high and medium).

Main types of precursors	FLIGHT STANDARDS	AIRWORTHINESS	CNS/ ATM	ADR
High important scenarios	* Flight crew monitoring & training * Use of aircraft instruments * Pilot induced error	* Aircraft System component failure or malfunction (display, autopilot, altimeter, engine, nose wheel steering) * FMS/ RNAV/ Flight control management (e.g. instrument display, speed, altimeter…) * AIS data failure	* Navaids equipments (ILS, MLS, GBAS signal or failure) * Data Processing (AIS, Coordination & transfer) * Safety Nets * ATCO situation evaluation * ATC induced conflict (communication, timing of instruction…) * Landing procedures * Take-off incursion	* Runway markings * Obstacle assessments * Runway & airsite conditions (compatibility wit SARPs) * ATCO error
Medium important scenarios	Operational situation evaluation (landing, take off, level bust…)	ACAS-RA Aircraft system failure	* Communication with pilot *Traffic planning *Coordination *Surveillance picture	Regulatory requirements AMAN/ DMAN spacing

Table 5-7 Main types of precursors at the origin of the safety scenarios for different domains

Moreover and according to [section 4], the following Figure 26 Level of implementation of regulatory domains provides additional considerations about the level of implementation of some areas of regulatory domains.

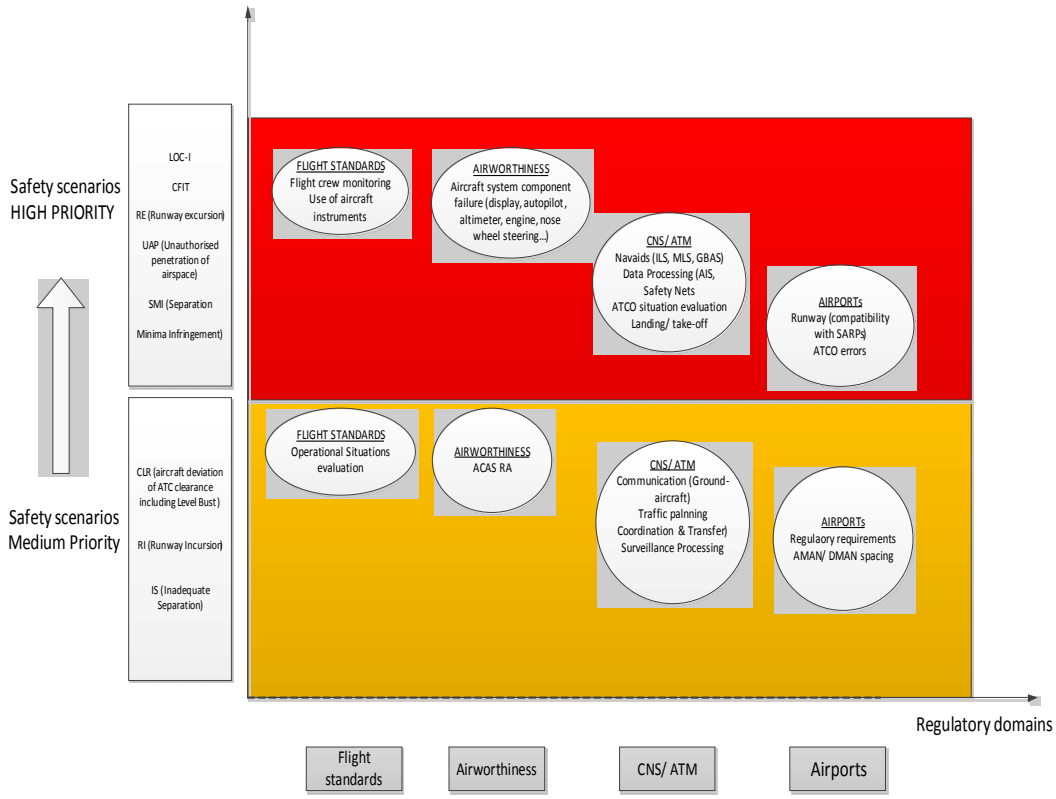

Figure 26 Potential influence of Domains Regulatory Frameworks on Safety Scenarios

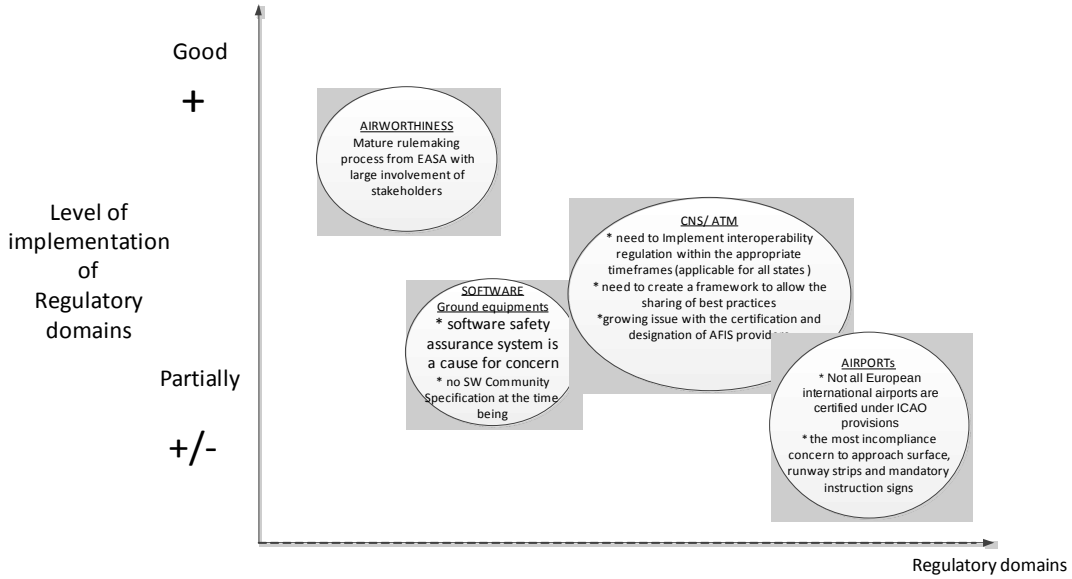

Figure 27 Level of implementation of regulatory domains

Based on these data, and by taking into account the fact that the availability of data for this analysis is sometimes limited, it is considered here that the degree of implementation is globally the following:

- Operations and FCL, Aircraft/airworthiness --> good
- ATM/ANS, Aerodromes --> medium (weak in some cases)

Finally the level of interactions between domains for each safety scenario must be considered in order to have a view in terms of potential gaps or incoherence between regulatory domains (potential sources of shortcomings)

This assessment results indicates that the interaction level is the following for each regulatory domain:

- Aircraft/airworthiness and Operations and FCL --> very important
- Aircraft/airworthiness and ATM/ANS--> very important
- Operations and FCL and ATM/ANS --> very important
- Operations and FCL and Aerodromes --> important
- ATM/ANS and Aerodromes --> important
- Aircraft/airworthiness and Aerodromes --> less important.

Finally for the regulatory domains, a detail is provided in terms of high level description of related topics (e.g. System failure…). The Figure 28 is providing the overview of shortcoming/ bottleneck analysis.

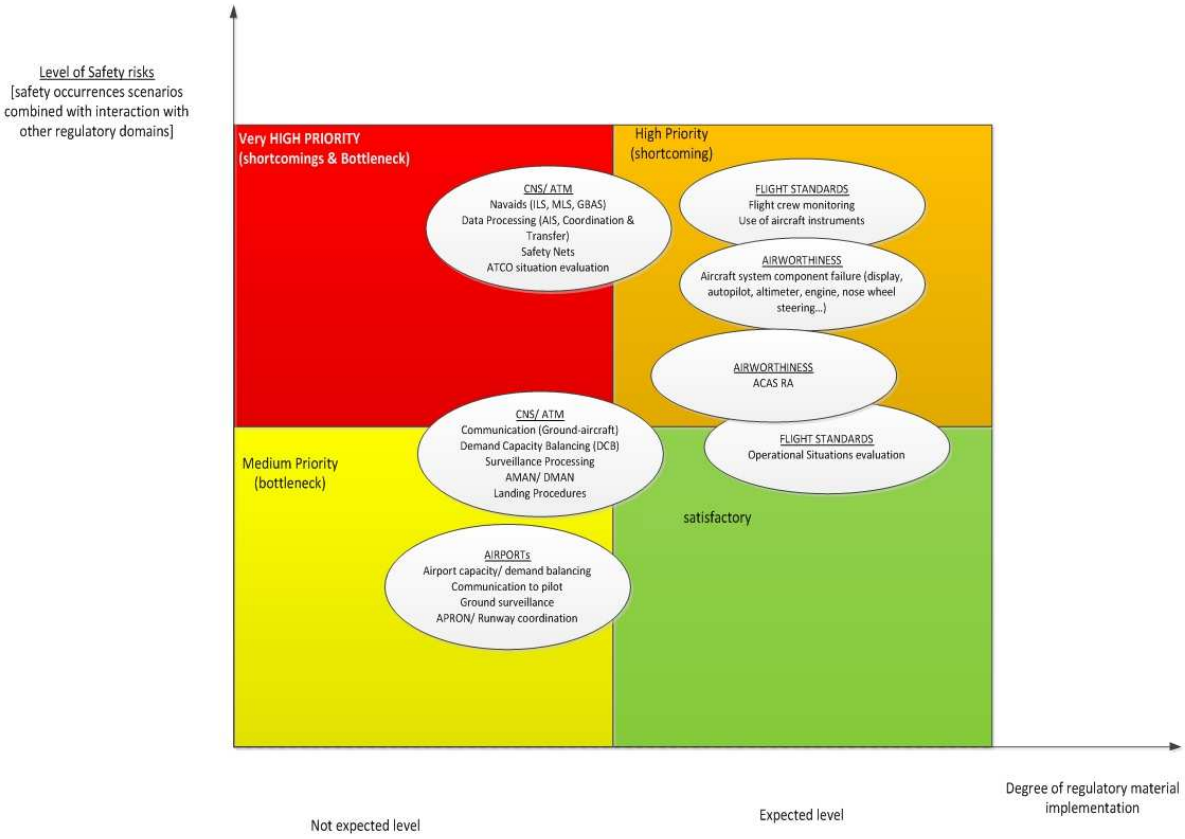

Figure 28 STEP3 Regulatory domains initial analysis (shortcomings/ bottlenecks)

5.5 (STEP4) Additional considerations

The analysis of the above can lead to some specific conclusions. Aviation and air transport are currently amongst the most regulated domains in contemporary world. The cost of meeting an implementation of regulation is considered as very significant. For some sectors of aviation industry it is even perceived as real inhibitor in its rapid development. It is rather clear that improving commercial aviation safety should not have impact on the total operation cost of aircraft. It can only be achieved by focussing efforts on simplifying current regulatory framework. Novel approach should consider regulations as rather a bottleneck than mean to achieve relevant level of safety. It should be long process, not revolution, focussed on sustaining the current level of safety during implementation by employing compensation actions. Full implementation will result with higher level of safety. This suggestion seems to be relevant especially if accidents and incidents analysis results are taken into consideration. The rationale can be as follow:

Three previous steps as well as other sources indicate clearly on weight of human factor. According to the [7] 80 % of all accidents have a human error contribution and 66 % of all accidents identify flight crew errors as primary cause. These rates are unchanged despite technological advances. Moreover human errors involve many different factors and issues which are difficult to identify and represents a major opportunity for safety improvements. Therefore, according to [7], a better understanding of the range of human skills is needed and lessons learned knowledge have to be disseminated to all those with human factors responsibility. The actions should aim at achieving benefit from human engineering "best practices" sharing within industry. It is expected that such approach would lead to expansion of regulation range in area of training and increasing the value of pilot work resulting with higher aircraft operational cost.

5.6 Summary

5.6.1.1 Initial results regarding bottlenecks and shortcomings in regulations and certification processes

The analysis of this chapter provides the following results regarding bottlenecks and shortcomings in the regulations and the certification processes:

- ATC/CNS domain can be identified as the most critical for safety, especially in the areas of Navaids, data processing, safety nets and ATCO situation evaluation. It should not be astonishing, due to the fact that they take part in almost all the activities related to air transport. It is also highly dependent on human competence and skills. Advance in this area can lead to significant decrease of number of incidents and accidents in commercial aviation, as well as improvement in other domains.
- Other important domains with identified high priority shortcomings are the Flight Standards and the Airworthiness domains. As critical areas, flight crew training and monitoring, as well as aircraft systems reliability are pointed.
- Evaluated as being of less importance are the ATC areas related to communication, demand capacity balancing, surveillance processing and start and landing procedures including runway incursion. There are airport bottlenecks that are also pointed, especially in terms of airport capacity / demand balancing, communication to pilot, ground surveillance and APRON and runway coordination.
- Additionally, it should be highlighted that there is a need for elaboration of tools ensuring proper and full execution of the ICAO Annex 14 SARPs at Aerodromes. Lack of a regulatory requirement to provide flight crews with a consistent format of take-off and landing data for all runway conditions. Inadequate regulation for the provision of correct, up-to-date and timely runway condition is reported. There is no international standard for measuring and reporting runway conditions.
- Generally, it can be said that in many cases human error can be identified as direct cause of the accidents, both pilots and maintenance personnel are taken into consideration. Elaboration of design techniques in the area of piloting as well as maintenance and better addressing the avoidance of

error-prone solutions is necessary. There is a need of developing adequate regulations addressing human-machine interface area, as well eliminating error-prone solutions.

5.6.1.2 Validation of the results

It is recognised that these initial results were not subject to formal validation. If one is to take the findings from the annual statistical reviews of Global Accidents by ICAO, EASA, UK CAA and Boeing as a reference point and compare them with these initial results, there does not appear to be an obvious correlation.

The following summary of reports from ICAO, EASA, UKCAA and Boeing show how each are similar in their findings. Each reports roughly constant fatal accident rates, with a slight downward trend. The key risks identified were; Loss of control, CFIT, and Runway Excursions. Post-crash fire also featured highly in worldwide studies, however was shown to be less common in European, and specifically EASA MS, countries. Similarly Runway Excursions rarely resulted in fatal accidents within EASA MS countries; however they have been identified as a high risk due to the number of non-fatal Runway Excursion accidents.

In contrast the most significant finding in our research is a very high priority issue (i.e. one with both bottlenecks and shortcomings) due to CNS/ATM equipment.

It is anticipated that the model of the total aviation system (i.e. the deliverable of WP 3.x) will assist in the determination of any correlation.

5.6.1.3 Reuse of the process

The process as described applies to the current total aviation system as it relies on an understanding of the observed impact of regulation on the observed precursors to accidents. This understanding, or observed relationship, is in effect the engine of the process.

It is envisaged that, providing there is a complete model of any proposed future total aviation system, the process could be applied to the proposed future total aviation system by replacing the 'engine' with one based on the 'predicted impact of regulation on the predicted precursors'. The result from running the process in this manner could then be used to help determine the requirements for the appropriate regulatory oversight.

6 Existing studies of shortcomings and bottlenecks

This section provides the results of an investigation of existing studies of shortcomings and bottlenecks. The following documents have been reviewed:

- The FAA's Commercial Airplane Certification Process Study [7] that provides an evaluation of selected aircraft certification, operations, and maintenance processes.
- The NIMROD Review [29], which provides an independent review into the broader issues surrounding the loss of a military NIMROD aircraft in Afghanistan in 2006. It identifies bottlenecks in the use of safety cases in military aviation, and provides associated recommendations, both of which are of potential relevance for civil aviation as well. From SESAR's definition phase, WP1.6.1/ D1 [30] gives an overview of the ATM safety regulatory framework. It states that ATM safety regulation has been successful in delivering an acceptably safe ATM system across Europe, but that there are many issues with the way the current arrangements are working.
- An EASA Opinion [31] regarding the future development of the ATM safety regulatory framework.

From this review, the following conclusions are drawn regarding shortcomings and bottlenecks:

- The FAA's Commercial Airplane Certification Process Study [7] identifies a number of shortcomings and bottlenecks in certification, of which many are also applicable to Europe and are still applicable to the situation of today. Here we list the five focus areas, and for each an example:
    - The airplane certification process. For example regulations do not yet adequately address the subject of human error in design, operations and maintenance;
    - Aviation safety data management. For example, multiple data collection and analysis programs exist in Europe without adequate coordination or executive oversight;
    - The interfaces between maintenance, operations, and certification. For example, improvement is still possible in capturing the lessons learned from specific experiences in manufacturing, maintenance, and flight operations, and in making these available for the aviation industry.
    - Major repairs and modifications. For example, inconsistencies exist between the safety assessments conducted for the initial type certificate (TC) and some of those conducted for subsequent alterations to the aircraft as there is no established and detailed enough safety assessment methodology commonly used by all interested parties.
    - Safety oversight process. For example, there are inconsistent processes to detect and correct errors made by individuals in for example design or certification.
- The NIMROD Review [29] concluded that the safety case regime in military aviation lost its way. It led to a culture of 'paper safety' at the expense of real safety, and did not represent value for money.
  Shortcomings of safety cases identified in the military environment included bureaucratic length; their obscure language; a failure to see the wood for the trees; archaeological documentary exercises; routine outsourcing to industry; lack of vital operator input; disproportionality; ignoring of age issues; compliance-only exercises; audits of process only; and prior assumptions of safety and 'shelf-ware'. Other sources also warned for many of these criticisms of safety cases (Ladbroke Grove Rail Inquiry, and the writings of Professor McDermid's Department at the University of York). Safety cases were intended to be just an aid

supporting risk analysis processes and studies but became an end in themselves. While this bottleneck was identified for military certification, it presents several risks for the use of safety cases in civil certification as well. It should be considered that safety cases need to be improved due to the current level of maturity of stakeholders regarding this approach. Safety cases in itself are a good approach, and safety studies must take into account the lessons learned and recommendations from the NIMROD study.

- From both SESAR WP1.6.1/ D1 [30] and EASA Opinion 02/2010 [31] it is known that there are many issues associated to the current ATM safety regulation framework, e.g.,:
    - Solving the fragmentation and variability in regulations over different domains of air transport, and in the interpretation of regulations over European countries;
    - Improving safety accountability: The complex safety regulatory framework and the often detailed and prescriptive nature of safety regulations easily result in confusion over safety accountability;
    - Reducing duplication of regulations, as overlap and contradictions lead to confusion and difficulty;
    - Reducing complexity of regulation, which otherwise leads to ambiguity regarding compliance; and
    - Improving cost effectiveness: it should be clear how ATM safety regulation contributes to cost-effective management of safety.

7 Conclusions and recommendations

7.1 Conclusions

This document presents an identification of shortcomings and bottlenecks in the current regulations and certification processes. The total aviation system was considered. Two complementary approaches were followed.

Firstly, an approach was followed that investigated which safety occurrences have relatively high or increasing risk, and which areas have a relatively low level of implementation of regulations. This analysis made use of data from EASA and SRC annual safety reports [1, 5]. The underlying assumptions were:

- Classes of safety occurrences for which the risk is relatively high or increasing may point to shortcomings of the associated regulations and certification processes; some of which may be associated to interactions between regulatory domains; and
- Areas where the implementation level of regulations is low may point to bottlenecks in the associated regulations and certification processes.

The main conclusions regarding shortcomings and bottlenecks in the current regulations and certification processes from this analysis are:

- In many cases, human errors can be identified as direct cause of the accidents, both when piloting as well as during maintenance works. Elaboration of design techniques in the area of piloting as well as maintenance to better address the avoidance of error-prone solutions is necessary. There is a need for developing adequate regulations addressing the human-machine interface, ergonomics and human limitations aspects, as well as eliminating error-prone solutions. Due to the importance of human factors aspects as source of risks, this aspect must be considered whatever the regulatory domain (airborne and ground).
- Elaboration of tools ensuring proper and full execution of ICAO Annex 14 SARPs at Aerodromes. Lack of regulatory requirements to provide flight crews with a consistent format of take-off and landing data for all runway conditions. Inadequate regulation for the provision of correct, up-to-date and timely runway condition reports. Currently, no international standard exists for measuring and reporting runway conditions.
- CNS/ATM can be identified as a critical area for safety benefit due to the importance of human factors aspects as source of risks, level of change of operational concepts for the coming years evolving from SESAR, no visible improvement regarding the situation of ATM support functions (e.g. software), and level of implementation of interoperability regulation. Improvements in this field could help

significantly in further reducing commercial aviation incidents and accidents. In this context, it should be noted that improving the collection of incidents and accident statistics to better understand the severity of incidents in the CNS/ATM domain may bring additional insight and benefits.

Secondly, a review was conducted of existing studies of identified shortcomings and bottlenecks in the certification process and regulations. The main conclusions from this review are as follows:

- Several shortcomings exist in the following certification areas: the aircraft certification process; aviation safety data management; the interfaces between maintenance, operations, and certification; major repairs and modifications; and the safety oversight process.
- There are certain risks with the use of safety cases in certification. Various potential shortcomings of the use of safety cases were identified in a military setting, but are of potential interest for the civil domain as well. It should be considered that safety cases need to be improved due to the current level of maturity of stakeholders regarding this approach. Safety cases in itself are a good approach, and ASCOS further studies must take into account the lessons learned and recommendations from the NIMROD study [29].
- There are many issues associated to the current ATM safety regulation framework, regarding e.g., fragmentation and variability, safety accountability, overlap and contradictions and complexity. It is noted that current EASA initiatives aim to address these shortcomings.

7.2 Recommendations

It was planned to analyse the existing European certification and rulemaking processes (for aircraft systems, flight operations, continued airworthiness, air traffic services, and airports), including the already anticipated changes, and identify their shortcomings and bottlenecks. For example, some potential issues should have been identified concerning potential overlap between regulatory requirements, lack of clear accountability for regulated entities, inappropriate actual requirements due to technological changes and emerging risks. Because the anticipated work turned out to be more extensive than anticipated, this is not (yet) fully achieved.

Therefore, it is recommended to continue, within the remainder of ASCOS WP1, with the following activities:

- To analyse the question, based on current certification and rulemaking processes, if there is any overlap between regulatory requirements, and if so how serious is that; an example could be the certification requirements and the operational requirements for standby instruments, which are overlapping and inconsistent. But there may be many more (e.g. for TCAS, ACAS, etc.);
- To analyse the issue of lack of clear accountability for regulated entities in current certification and rulemaking processes; for instance how is accountability organised at European level and at National Level, what is the impact of the Single European Sky (SES) regulations on this, how is the accountability organised between EASA and national authorities, in the various domains, etcetera.

- To analyse the issue of inappropriate actual requirements due to technological changes and emerging risks; can we identify inappropriate actual requirements? Most likely there are several issues, e.g. the role of the Flight Management System (FMS) in light of the ever increasing functionality of FMS (e.g. due to introduction of advanced RNP); the requirements for training of rare failure modes (e.g. consider the Airbus France Flight 447, which crashed on 1 June 2009); the currently applicable target levels of safety (are they still appropriate in view of the anticipated changes?).

The current analysis has focused on the most relevant accident types and the impact that the current certification and rulemaking processes could have on those accident types. However, the main objective of ASCOS is not to increase safety directly, but to develop novel certification process adaptations and supporting safety driven design methods and tools to ease the certification of safety enhancement systems and operations. So, the main purpose is to define a more efficient, cheaper, quicker process, such that it is easier to introduce new systems, and in particular safety enhancement systems (and hence it would increase safety indirectly). It is therefore recommended to address the opportunities for a more efficient process in more detail in the subsequent activities within WP1 of the ASCOS project.

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Appendix A Catalogue of the existing regulations

Appendix A.1 Basic Regulation

A1.1.	Name of document:	COMMISSION REGULATION (EU) No 6/2013 of 8 January 2013 amending Regulation (EC) No 216/2008 of the European Parliament and of the Council 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
	Authority that issued the document:	THE EUROPEAN COMMISSION
	Date and place of publication:	Brussels, 8 January 2013
	Date of entry into force:	This Regulation was entered into force on the 20th day following that of its publication in the Official Journal of the European Union.
	The territorial range:	This Regulation shall be binding in its entirety and directly applicable in all Member States.
	Scope of regulation /standard:	Amendment to the Regulation (EC) No 216/2008
	Documents issued under that legislation:	n/a
A1.2	Name of document:	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
	Authority that issued the document:	THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION
	Date and place of publication:	Strasbourg, 21 October 2009
	Date of entry into force:	This Regulation was entered into force on the 20th day following its publication in the Official Journal of the European Union. The Commission shall adopt the measures referred to in Article 8a(5) of Regulation (EC) No 216/2008 as amended by this Regulation before 31 December 2013. Article 8a shall apply as from the dates specified in those measures. The Commission shall adopt the measures referred to in Article 8b(6) and Article 8c(10) of Regulation (EC) No 216/2008 as amended by this Regulation before 31 December 2012. Articles 8b and 8c shall apply as from the dates specified in those measures.
	The territorial range:	This Regulation shall be binding in its entirety and directly applicable in all Member States.
	Scope of regulation /standard:	Amendment to the Regulation (EC) No 216/2008
	Documents issued under that legislation:	ANNEX ANNEX Va - Essential Requirements for Aerodromes ANNEX Vb - Essential Requirements for ATM/ANS and Air Traffic Controllers

	Note:	Directive 2006/23/EC is hereby repealed The provisions of Directive 2006/23/EC shall continue to apply, on a transitional basis, until the date of application of the measures referred to in Article 8c(10) of Regulation (EC) No 216/2008 as amended by this Regulation.
A1.3	Name of document:	COMMISSION REGULATION (EC) No 690/2009 of 30 July 2009 amending Regulation (EC) No 216/2008 of the European Parliament and the Council 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
	Authority that issued the document:	THE COMMISSION OF THE EUROPEAN COMMUNITIES
	Date and place of publication:	Brussels, 30 July 2009
	Date of entry into force:	This Regulation was entered into force the 20th day following its publication in the Official Journal of the European Union.
	The territorial range:	This Regulation shall be binding in its entirety and directly applicable in all Member States.
	Scope of regulation /standard:	Amendment to the Regulation (EC) No 216/2008
	Documents issued under that legislation:	n/a
A1.4	Name of document:	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 Amended by: - Commission Regulation (EC) No 690/2009 of 30 July 2009 (A4.1.3). - Regulation (EC) No 1108/2009 of the European Parliament and of the Council of 21 October 2009 (A4.1.2).
	Authority that issued the document:	THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION
	Date and place of publication:	Strasbourg, 20 February 2008 (consolidated version 14.12.2009)
	Date of entry into force:	This Regulation was entered into force on the 20th day following its publication in the Official Journal of the European Union. Articles 5, 6, 7, 8, 9 and 10 shall apply as from the dates specified in their respective implementing rules, but not later than 8 April 2012.
	The territorial range:	This Regulation shall be binding in its entirety and directly applicable in all Member States.
	Scope of regulation /standard:	1. This Regulation shall apply to: (a) the design, production, maintenance and operation of aeronautical products, parts and appliances, as well as personnel and organisations involved in the design, production and maintenance of such products, parts and appliances; (b) personnel and organisations involved in the operation of aircraft; (c) the design, maintenance and operation of aerodromes, as well as personnel and organisations involved therein and, without prejudice to

		Community and national legislation on environment and land-use planning, the safeguarding of surroundings of aerodromes; (d) the design, production and maintenance of aerodrome equipment, as well as personnel and organisations involved therein; (e) the design, production and maintenance of systems and constituents for air traffic management and air navigation services (ATM/ANS), as well as personnel and organisations involved therein; (f) ATM/ANS, as well as personnel and organisations involved therein. 2. This Regulation shall not apply to: (a) products, parts, appliances, personnel and organisations referred to in paragraph 1(a) and (b) while carrying out military, customs, police, search and rescue, fire fighting, coastguard or similar activities or services. The Member States shall undertake to ensure that such activities or services have due regard as far as practicable to the objectives of this Regulation; (b) aerodromes or part thereof, as well as equipment, personnel and organisations, referred to in paragraph 1(c) and (d), that are controlled and operated by the military; (c) ATM/ANS, including systems and constituents, personnel and organisations, referred to in paragraph 1(e) and (f) that are provided or made available by the military. The Member States shall undertake to ensure that aircraft referred to in point (a) of this paragraph are separated, where appropriate, from other aircraft. 3. Member States shall, as far as practicable, ensure that any military facilities open to public use referred to in paragraph 2(b) or services provided by military personnel to the public referred to in paragraph 2 (c), offer a level of safety that is at least as effective as that required by the essential requirements as defined in Annexes Va and Vb.
	Documents issued under that legislation:	ANNEX I - Essential requirements for airworthiness referred to in Article 5 ANNEX II - Aircraft referred to in Article 4(4) ANNEX III - Essential requirements for pilot licensing referred to in Article 7 ANNEX IV - Essential requirements for air operations referred to in Article 8 ANNEX V - Criteria for qualified entities referred to in Article 13 (‘qualified entity’ or ‘entity’) ANNEX Va - Essential Requirements for Aerodromes ANNEX Vb - Essential Requirements for ATM/ANS and Air Traffic Controllers ANNEX VI - Correlation Table
	Note:	1. Regulation (EC) No 1592/2002 is hereby repealed, without prejudice to the provisions of the second subparagraph. References made to the repealed Regulation shall be construed as being made to this Regulation and should be read in accordance with the correlation table set out in Annex VI. 2. Council Directive 91/670/EEC is hereby repealed as from the entry into force of the measures referred to in Article 7(6). 3. Annex III to Regulation (EEC) No 3922/91 shall be deleted as from the entry into force of the corresponding measures referred to in Article 8(5). 4. The provisions of Article 11 shall apply to products, parts and appliances, organisations and persons whose certification has been performed, or recognised, in accordance with the provisions of the acts referred to in paragraph 1, 2 and 3 of this Article. 5. Directive 2004/36/EC is hereby repealed as from the entry into force of the measures referred to in Article 10(5) of this Regulation, and without prejudice to the implementing rules referred to in Article 8(2) of that Directive

Appendix A.2 Initial airworthiness and Continuing airworthiness

Appendix A.2.1 Airworthiness and Environmental Certification

Implementing Rule

A2.1.1.1	Name of document:	COMMISSION REGULATION (EU) No 7/2013 of 8 January 2013 amending Regulation (EU) No 748/2012 laying down Implementing Rules for the airworthiness and environmental certification of aircraft and related products, parts and appliances, as well as for the certification of design and production organisations
	Authority that issued the document:	EUROPEAN COMMISSION (EU)
	Date and place of publication:	Brussels, 8 January 2013
	Date of entry into force:	This Regulation was entered into force on the twentieth day following that of its publication in the Official Journal of the European Union.
	The territorial range:	This Regulation shall be binding in its entirety and directly applicable in all Member States.
	Scope of regulation /standard:	Amendment to the Regulation (EC) No 748/2012
	Documents issued under that legislation:	n/a
A2.1.1.2	Name of document:	COMMISSION REGULATION (EU) No 748/2012 of 3 August 2012 laying down implementing rules for the airworthiness and environmental certification of aircraft and related products, parts and appliances, as well as for the certification of design and production organisations This Regulation was amended by: (EU) No 7/2013 of 08 January 2013
	Authority that issued the document:	EUROPEAN COMMISSION (EU)
	Date and place of publication:	Brussels, 3 August 2012
	Date of entry into force:	This Regulation was entered into force on the twentieth day following that of its publication in the *Official Journal of the European Union* (date of publication: 21.08.2012).
	The territorial range:	This Regulation shall be binding in its entirety and directly applicable in all Member States.
	Scope of regulation /standard:	This Regulation lays down common technical requirements and administrative procedures for the airworthiness and environmental certification of products, parts and appliances specifying: (a) the issue of type-certificates, restricted type-certificates, supplemental type-certificates and changes to those certificates; (b) the issue of certificates of airworthiness, restricted certificates of airworthiness, permits to fly and authorized release certificates; (c) the issue of repair design approvals; (d) the showing of compliance with environmental protection requirements;

		(e) the issue of noise certificates; (f) the identification of products, parts and appliances; (g) the certification of certain parts and appliances; (h) the certification of design and production organizations; (i) the issue of airworthiness directives.
	Documents issued under that legislation:	Annex I: Part 21 – Certification of aircraft and related products, parts and appliances, and of design and production organizations.
	Note:	Regulation (EC) No 1702/2003 (including the Annex Part-21) and its 7 subsequent amendments is replaced as of 10th September 2012 by the recently published Regulation (EU) No 748/2012.

Certification Specification

A2.1.2.1	Name of document:	Decision No 2009/009/R OF THE EXECUTIVE DIRECTOR OF THE AGENCY OF 30 APRIL 2009 revoking Decision No 2009/004/R of the Executive Director of the Agency of 26 February 2009 amending Decision No 2003/13/RM of the Executive Director of the Agency of 14 November 2003 on Certification Specifications, including Airworthiness Code and Acceptable Means of Compliance, for sailplane and powered sailplanes "CS-22" and amending Decision No 2003/13/RM of the Executive Director of the Agency of 14 November 2003 on Certification Specifications, including Airworthiness Code and Acceptable Means of Compliance, for sailplane and powered sailplanes "CS-22".
	Authority that issued the document:	THE EXECUTIVE DIRECTOR OF THE AGENCY
	Date and place of publication:	Cologne, 30 April 2009
	Date of entry into force:	This Decision was entered into force on 30 April 2009.
	Scope of regulation /standard:	Executive Director Decision No 2009/004/R of 26 February 2009 containing the certification specifications, including airworthiness code and acceptable means of compliance, for sailplanes and powered sailplanes ("CS-22") is hereby revoked. The Annex to the Executive Director Decision No 2003/13/RM of 14 November 2003 containing the certification specifications, including airworthiness code and acceptable means of compliance, for sailplanes and powered sailplanes ("CS-22") is replaced by the Annex to this Decision.
	Documents issued under that legislation:	Annex: CS-22/Amendment 2 (05/03/2009) – Certification Specifications for Sailplanes and Powered Sailplanes. Contents: BOOK 1 – Airworthiness code; BOOK 2 – AMC.
A2.1.2.2	Name of document:	DECISION 2012/012/R OF THE EXECUTIVE DIRECTOR OF THE AGENCY OF 13 JULY 2012 amending Decision 2003/14/RM of the Executive Director of the Agency of 14 November 2003 on Certification Specifications for Normal, Utility, Aerobatic, and Commuter Category Aeroplanes ("CS-23").
	Authority that issued the document:	THE EXECUTIVE DIRECTOR OF THE AGENCY
	Date and place of publication:	Cologne, 13 July 2012

	Date of entry into force:	This Decision was entered into force on 20 July 2012.
	Scope of regulation /standard:	The Annex to the Executive Director Decision 2003/14/RM of 14 November 2003 containing the certification specifications, including airworthiness code and acceptable means of compliance, applicable to normal, utility, aerobatic and commuter aeroplanes ("CS-23") is replaced by the Annex to this Decision.
	Documents issued under that legislation:	Annex: CS-23/Amendment 3 (20/07/2012) – Certification Specifications for Normal, Utility, Aerobatic, Commuter Category Aeroplanes. Contents: BOOK 1 – Airworthiness code; BOOK 2 – AMC + FTG.
A2.1.2.3	Name of document:	DECISION 2012/008/R OF THE EXECUTIVE DIRECTOR OF THE AGENCY OF 6 JULY 2012 amending Decision 2003/02/RM of the Executive Director of the Agency of 17 October 2003 on Certification Specifications and Acceptable Means of Compliance for Large Aeroplanes ("CS-25").
	Authority that issued the document:	THE EXECUTIVE DIRECTOR OF THE AGENCY
	Date and place of publication:	Cologne, 06 July 2012
	Date of entry into force:	This Decision was entered into force on 13 July 2012.
	Scope of regulation /standard:	The Annex to the Executive Director Decision 2003/2/RM of 17 October 2003 containing the Certification Specifications, including Airworthiness Code and Acceptable Means of Compliance, applicable to Large Aeroplanes ("CS25") is replaced by the Annex to this Decision.
	Documents issued under that legislation:	Annex: CS-25/Amendment 12 (13/07/2012) – Certification Specification and Acceptable Means of Compliance for Large Aeroplanes. Contents: BOOK 1 – Certification Specifications; BOOK 2 – AMC.
A2.1.2.4	Name of document:	DECISION No 2012/021/R OF THE EXECUTIVE DIRECTOR OF THE AGENCY OF 11 DECEMBER 2012 amending Decision No 2003/15/RM of the Executive Director of the Agency of 14 November 2003 on Certification Specifications, Including Airworthiness Code and Acceptable Means of Compliance, for small rotorcraft "CS27".
	Authority that issued the document:	THE EXECUTIVE DIRECTOR OF THE AGENCY
	Date and place of publication:	Cologne, 11 December 2012
	Date of entry into force:	This Decision was entered into force on 18 December 2012.
	Scope of regulation /standard:	The Annex to the Executive Director Decision No 2003/15/RM of 14 November 2003 containing the certification specifications, including airworthiness code and acceptable means of compliance, applicable to small rotorcraft ("CS27") is replaced by the Annex to this Decision.
	Documents issued under that legislation:	Annex: CS-27/Amendment 3 (11/12/2012) – Certification Specification for Small Rotorcraft. Contents: BOOK 1 – Certification Specifications; BOOK 2 – AMC.
A2.1.2.5	Name of document:	DECISION No 2012/022/R OF THE EXECUTIVE DIRECTOR OF THE AGENCY OF 11 DECEMBER 2012 amending Decision No 2003/16/RM of the Executive Director of the Agency of 14 November 2003 on Certification Specifications, Including Airworthiness Code and Acceptable Means of Compliance, for large rotorcraft "CS-29".

	Authority that issued the document:	THE EXECUTIVE DIRECTOR OF THE AGENCY
	Date and place of publication:	Cologne, 11 December 2012
	Date of entry into force:	This Decision was entered into force on 18 December 2012.
	Scope of regulation /standard:	The Annex to the Executive Director Decision No 2003/16/RM of 14 November 2003 containing the certification specifications, including airworthiness code and acceptable means of compliance, applicable to large rotorcraft ("CS-29") is replaced by the Annex to this Decision.
	Documents issued under that legislation:	Annex: CS-29/Amendment 3 (11/12/2012) – Certification Specification for Large Rotorcraft. Contents: BOOK 1 – Certification Specifications; BOOK 2 – AMC.
A2.1.2.6	Name of document:	DECISION No 2011/012/R OF THE EXECUTIVE DIRECTOR OF THE EUROPEAN AVIATION SAFETY AGENCY OF 5TH DECEMBER 2011 on Certification Specifications and Acceptable Means of Compliance for Free Gas Balloons "CS-31GB".
	Authority that issued the document:	THE EXECUTIVE DIRECTOR OF THE AGENCY
	Date and place of publication:	Cologne, 05 December 2011
	Date of entry into force:	This Decision was entered into force on 12th December 2011.
	Scope of regulation /standard:	The Certification Specifications and Acceptable Means of Compliance for Free Gas Balloons ("CS-31GB") are those laid down in the Annex to this Decision.
	Documents issued under that legislation:	Annex: CS-31GB/Initial Issue (05/12/2011) – Certification Specification and Acceptable Means of Compliance for Free Gas Balloons. Contents: BOOK 1 – Certification Specifications; BOOK 2 – AMC.
A2.1.2.7	Name of document:	DECISION No 2011/013/R OF THE EXECUTIVE DIRECTOR OF THE AGENCY OF 5TH DECEMBER 2011 amending Decision No 2009/005/R of the Executive Director of the Agency of 26 February 2009 on Certification Specifications, Including Airworthiness Code and Acceptable Means of Compliance, for Hot Air Balloons "CS-31HB".
	Authority that issued the document:	THE EXECUTIVE DIRECTOR OF THE AGENCY
	Date and place of publication:	Cologne, 05 December 2011
	Date of entry into force:	This Decision was entered into force on 12th December 2011.
	Scope of regulation /standard:	The Annex to the Executive Director Decision No 2009/005/R of 26 February 2009 containing the Certification Specifications, including Airworthiness Code and Acceptable Means of Compliance, applicable to Hot Air Balloons (CS-31HB) is replaced by the Annex to this Decision. The Certification Specifications and Acceptable Means of Compliance for Hot Air Balloons (CS-31HB) are those laid down in the Annex to this Decision.

	Documents issued under that legislation:	Annex: CS-31HB/Amendment 1 (05/12/2011) – Certification Specification and Acceptable Means of Compliance for Hot Air Balloons. Contents: BOOK 1 – Certification Specifications; BOOK 2 – AMC.
A2.1.2.8	Name of document:	DECISION No 2013/002/R OF THE EXECUTIVE DIRECTOR OF THE AGENCY OF 23 JANUARY 2013 amending Decision No 2003/03/RM of the Executive Director of the Agency of 17 October 2003 on certification specifications providing for acceptable means of compliance for aircraft engine emissions and fuel venting ('CS-34').
	Authority that issued the document:	THE EXECUTIVE DIRECTOR OF THE AGENCY
	Date and place of publication:	Cologne, 23 January 2013
	Date of entry into force:	This Decision was entered into force on 29 January 2013.
	Scope of regulation /standard:	The Annex Certification Specifications for Aircraft Engine Emissions and Fuel Venting ('CS-34') to ED Decision 2003/03/RM of 17 October 2003 is hereby amended in accordance with the annex to this Decision.
	Documents issued under that legislation:	Annex: Certification Specifications and Acceptable Means of Compliance for Aircraft Engine Emissions and Fuel Venting CS-34. Amendment 1, 29 January 2013 Contents: BOOK 1 – Aircraft Engine Emissions And Fuel Venting Requirements; BOOK 2 – AMC + GM.
A2.1.2.9	Name of document:	DECISION No 2013/003/R OF THE EXECUTIVE DIRECTOR OF THE AGENCY OF 23 JANUARY 2013 amending Decision No 2003/04/RM of the Executive Director of the Agency of 17 October 2003 on certification specifications providing for acceptable means of compliance for aircraft noise ("CS36").
	Authority that issued the document:	THE EXECUTIVE DIRECTOR OF THE AGENCY
	Date and place of publication:	Cologne, 23 January 2013
	Date of entry into force:	This Decision was entered into force on 29 January 2013.
	Scope of regulation /standard:	The Annex "Certification Specifications and Acceptable Means of Compliance for Aircraft Noise CS-36" to Decision ED/2003/04/RM of 17 October 2003 is hereby amended in accordance to this Decision.
	Documents issued under that legislation:	Annex: CS-36/ Amendment 3 (29 January 2013) – Certification Specifications and Acceptable Means of Compliance for Aircraft Noise. Contents: BOOK 1 – Noise Requirements; BOOK 2 – AMC + GM.
A2.1.2.10	Name of document:	DECISION NO. 2003/5/RM OF THE EXECUTIVE DIRECTOR OF THE AGENCY of 17 October 2003 on certification specifications, including airworthiness codes and acceptable means of compliance, for auxiliary power units ("CS-APU").
	Authority that issued the document:	THE EXECUTIVE DIRECTOR OF THE AGENCY
	Date and place of publication:	Brussels, 17 October 2003
	Date of entry into force:	This Decision was entered into force on 17 October 2003.

	Scope of regulation /standard:	The certification specifications, including airworthiness codes and acceptable means of compliance, for auxiliary power units are those laid down in the Annex to this Decision.
	Documents issued under that legislation:	Annex: CS-APU/ Initial Issue (17/10/2003) – Certification Specifications for Auxiliary Power Units. Contents: BOOK 1 – Airworthiness Code; BOOK 2 – AMC.
A2.1.2.11	Name of document:	DECISION No 2003/6/RM OF THE EXECUTIVE DIRECTOR OF THE AGENCY of 17 October 2003 on certification specifications, including airworthiness codes and acceptable means of compliance, for all weather operations (“CS-AWO”).
	Authority that issued the document:	THE EXECUTIVE DIRECTOR OF THE AGENCY
	Date and place of publication:	Brussels, 17 October 2003
	Date of entry into force:	This Decision was entered into force on 17 October 2003.
	Scope of regulation /standard:	The certification specifications, including airworthiness codes and acceptable means of compliance, for all weather operations are those laid down in the Annex to this Decision.
	Documents issued under that legislation:	Annex: CS-AWO/ Initial Issue (17/10/2003) – Certification Specifications for All Weather Operations. Contents: BOOK 1 – Airworthiness Code; BOOK 2 – AMC.
A2.1.2.12	Name of document:	DECISION No 2010/015/R OF THE EXECUTIVE DIRECTOR OF THE AGENCY OF 16 DECEMBER 2010 amending Decision No 2003/09/RM of the Executive Director of the European Aviation Safety Agency of 24 October 2003 on certification specifications, including airworthiness codes and acceptable means of compliance, for engines (“CS-E “).
	Authority that issued the document:	THE EXECUTIVE DIRECTOR OF THE AGENCY
	Date and place of publication:	Cologne, 16 December 2010
	Date of entry into force:	This Decision was entered into force on 23 December 2010.
	Scope of regulation /standard:	The Annex to the Executive Director Decision No 2003/09/RM of 24 October 2003 containing the Certification Specifications, including Airworthiness Codes and Acceptable Means of Compliance, applicable to Engines (“CS-E”) is replaced by the Annex to this Decision.
	Documents issued under that legislation:	Annex: CS-E/ Amendment 3 (23/12/2010) – Certification Specifications for Engines. Contents: BOOK 1 – Airworthiness Code; BOOK 2 – AMC.

A2.1.2.13	Name of document:	DECISION No 2003/10/RMOF THE EXECUTIVE DIRECTOR OF THE AGENCY of 24 October 2003 on certification specifications, including airworthiness codes and acceptable means of compliance, for European Technical Standard Orders ("CS-ETSO"). This Decision was amended the following Decisions: No 2012/009/R of 28 June 2012 No 2010/010/R of 14 December 2010 No 2009/015/R of 01 December 2009 No 2009/014/R of 14 October 2009 No 2008/012/R of 20 November 2008 No 2007/017/R of 18 December 2007 No 2006/04/R of 11 July 2006
	Authority that issued the document:	THE EXECUTIVE DIRECTOR OF THE AGENCY
	Date and place of publication:	Brussels, 24 October 2003
	Date of entry into force:	This Decision was entered into force on 24 October 2003.
	Scope of regulation /standard:	The certification specifications, including airworthiness codes and acceptable means of compliance, for European Technical Standard Orders are those laid down in the Annex to this Decision.
	Documents issued under that legislation:	Annexes: CS-ETSO/ Initial issue (24/10/2003) – European Technical Standard Orders. CS-ETSO Current Issue: (CS-ETSO has not been published as consolidated version) CS-ETSO/7 (05/07/2012) – ED Decision 2012/009/R CS-ETSO/6 (21/12/2010) – ED Decision 2010/010/R CS-ETSO/5 (08/12/2009) – ED Decision 2009/015/R CS-ETSO/4 (21/10/2009) – ED Decision 2009/014/R CS-ETSO/3 (28/11/2008) – ED Decision 2008/012/R CS-ETSO/2 (25/12/2007) – ED Decision 2007/017/R CS-ETSO/1 (18/07/2006) – ED Decision 2006/04/R Contents: ETSO index.
A2.1.2.14	Name of document:	DECISION No 2012/010/DIRECTORATE R OF THE EXECUTIVE DIRECTOR OF THE AGENCY of 4th July 2012 on the certification specifications for aeroplane flight simulation training devices.
	Authority that issued the document:	THE EXECUTIVE DIRECTOR OF THE AGENCY
	Date and place of publication:	Cologne, 04 July 2012
	Date of entry into force:	This Decision was entered into force on 11 July 2012.
	Scope of regulation /standard:	The "Certification Specifications for Aeroplane Flight Simulation Training Devices" are those laid down in the Annex to this Decision.
	Documents issued under that legislation:	Annex: CS-FSTD(A)/ Initial issue (04/07/2012) – Certification Specifications for Aeroplane Flight Simulation Training Devices. Contents: BOOK 1 – Certification Specification; BOOK 2 – AMC.

A2.1.2.15	Name of document:	DECISION N° 2012/011/DIRECTORATE R OF THE EXECUTIVE DIRECTOR OF THE AGENCY of 26th July 2012 on the certification specifications for helicopter flight simulation training devices.
	Authority that issued the document:	THE EXECUTIVE DIRECTOR OF THE AGENCY
	Date and place of publication:	Cologne, 26 July 2012
	Date of entry into force:	This Decision was entered into force on 03 July 2012.
	Scope of regulation /standard:	The "Certification Specifications for Helicopter Flight Simulation Training Devices" are those laid down in the Annex to this Decision.
	Documents issued under that legislation:	Annex: CS-FSTD(H)/ Initial issue (26/07/2012) – Certification Specifications for Helicopter Flight Simulation Training Devices. Contents: BOOK 1 – Certification Specification; BOOK 2 – AMC.
A2.1.2.16	Name of document:	DECISION No 2010/014/R OF THE EXECUTIVE DIRECTOR OF THE AGENCY OF 16 DECEMBER 2010 amending Decision No 2003/11/RM of the Executive Director of the Agency of 05 November 2003 on definitions and abbreviations used in Certification Specifications for products, parts and appliances ("CS-Definitions")
	Authority that issued the document:	THE EXECUTIVE DIRECTOR OF THE AGENCY
	Date and place of publication:	Cologne, 16 December 2010
	Date of entry into force:	This Decision was entered into force on 23 December 2010.
	Scope of regulation /standard:	The Annex to the Executive Director Decision No 2003/11/RM of 5 November 2003 containing definitions and abbreviations used in certification specifications for products, parts and appliances ("CS-Definitions") is replaced by the Annex to this Decision.
	Documents issued under that legislation:	Annex: CS-Definitions/ Amendment 2 (23/12/2010) – Definitions and abbreviations used in Certification Specifications for products, parts and appliances.
A2.1.2.17	Name of document:	DECISION No 2011/005/R OF THE EXECUTIVE DIRECTOR OF THE AGENCY OF 27 JUNE 2011 on Certification Specifications and Acceptable Means of Compliance for Light Sport Aeroplanes "CS-LSA".
	Authority that issued the document:	THE EXECUTIVE DIRECTOR OF THE AGENCY
	Date and place of publication:	Cologne, 27 June 2011
	Date of entry into force:	This Decision was entered into force on 04 July 2011.
	Scope of regulation /standard:	The Certification Specifications and Acceptable Means of Compliance for Light Sport Aeroplanes ("CS-LSA") are those laid down in the Annex to this Decision.
	Documents issued under that legislation:	Annex: CS-LSA/ Initial issue (27/06/2011) – Certification Specifications for Light Sport Aeroplane. Contents: BOOK 1 – Certification Specifications; BOOK 2 – AMC.

A2.1.2.18	Name of document:	DECISION No 2006/09/R OF THE EXECUTIVE DIRECTOR OF THE AGENCY of 16 November 2006 on certification specifications, including airworthiness codes and acceptable means of compliance, for propellers (“CS-P “).
	Authority that issued the document:	THE EXECUTIVE DIRECTOR OF THE AGENCY
	Date and place of publication:	Cologne, 16 November 2006
	Date of entry into force:	This Decision was entered into force on 16 November 2006.
	Scope of regulation /standard:	The Annex “Certification Specifications for Propellers (CS-P)” to Decision ED/2003/07/RM of the Executive Director of the Agency of 24 October 2003 is hereby amended in accordance with the Annex to this decision.
	Documents issued under that legislation:	Annex: CS-P/ Amendment 1 (16/11/2006) – Certification Specifications for Propellers. Contents: BOOK 1 – Airworthiness code; BOOK 2 – AMC.
A2.1.2.19	Name of document:	DECISION No 2009/003/R OF THE EXECUTIVE DIRECTOR OF THE AGENCY of 26 February 2009 amending Decision No 2003/18/RM of the Executive Director of the Agency of 14 November 2003 on Certification Specifications, Including Airworthiness Code and Acceptable Means of Compliance, for very light aeroplanes (“CS-VLA“).
	Authority that issued the document:	THE EXECUTIVE DIRECTOR OF THE AGENCY
	Date and place of publication:	Cologne, 26 February 2009
	Date of entry into force:	This Decision was entered into force on 05 March 2009.
	Scope of regulation /standard:	The Annex to the Executive Director Decision No 2003/18/RM of 14 November 2003 containing the certification specifications, including airworthiness code and acceptable means of compliance, for very light aeroplanes (“CS-VLA”) is replaced by the Annex to this Decision.
	Documents issued under that legislation:	Annex: CS-VLA/ Amendment 1 (05/03/2009) – Certification Specifications for Very Light Aeroplanes. Contents: BOOK 1 – Airworthiness code; BOOK 2 – AMC.
A2.1.2.20	Name of document:	DECISION No 2008/011/R OF THE EXECUTIVE DIRECTOR OF THE AGENCY OF 10 NOVEMBER 2008 amending Decision No 2003/17/RM of the Executive Director of the Agency of 14 November 2003 on Certification Specifications, Including Airworthiness Code and Acceptable Means of Compliance, for very light rotorcraft ” CS-VLR ”.
	Authority that issued the document:	THE EXECUTIVE DIRECTOR OF THE AGENCY
	Date and place of publication:	Cologne, 10 November 2008
	Date of entry into force:	This Decision was entered into force on 17 November 2008.
	Scope of regulation /standard:	The Annex to the Executive Director Decision No 2003/17/RM of 14 November 2003 containing the certification specifications, including airworthiness code and acceptable means of compliance, applicable to very light rotorcraft (“CS-VLR”) is replaced by the Annex to this Decision.

	Documents issued under that legislation:	Annex: CS-VLR/ Amendment 1 (17/11/2008) – Certification Specifications for Very Light Rotorcraft. Contents: BOOK 1 – Airworthiness code; BOOK 2 – AMC.

Appendix A.2.2 Continuing Airworthiness

A2.2.1	Name of document:	COMMISSION REGULATION (EC) No 2042/2003 of 20 November 2003 on the continuing airworthiness of aircraft and aeronautical products, parts and appliances, and on the approval of organisations and personnel involved in these tasks. This Regulation was amended by: (EC) No 707/2006 of 08 May 2006 (EC) No 376/2007 of 30 March 2007 (EC) No 1056/2008 of 27 October 2008 (EU) No 127/2010 of 5 February 2010 (EU) No 962/2010 of 26 October 2010 (EU) No 1149/2011 of 21 October 2011 (EU) No 593/2012 of 5 July 2012
	Authority that issued the document:	THE COMMISSION OF THE EUROPEAN COMMUNITIES (EC)
	Date and place of publication:	Brussels, 20 November 2003
	Date of entry into force:	1. This Regulation shall enter into force on the day following that of its publication in the *Official Journal of the European Union*. 2. By way of derogation from paragraph 1 : (a) the provisions of Annex I, except for points M.A.201(h)(2) and M.A.708(c), shall apply from 28 September 2005; (b) point M.A.201(f) of Annex I shall apply to aircraft not involved in commercial air transport operated by third country carriers as from 28 September 2009. 3. By way of derogation from paragraph 1 and 2, Member States may elect not to apply: (a) the provisions of Annex I to aircraft not involved in commercial air transport, until 28 September 2009; (b) the provisions of Annex I(I) to aircraft involved in commercial air transport, until 28 September 2008; (c) the following provisions of Annex II, until 28 September 2006: — 145.A.30(e), human factors elements, — 145.A.30(g) as applicable to large aircraft with a maximum take-off mass of more than 5 700 kg, — 145.A.30(h)(1) as applicable to aircraft with a maximum take-off mass of more than 5 700 kg, — 145.A.30(j)(1), Appendix IV, — 145.A.30(j)(2), Appendix IV; (d) the following provisions of Annex II, until 28 September 2008: — 145.A.30(g) as applicable to aircraft with a maximum take-off mass of 5 700 kg or below, — 145.A.30(h)(1) as applicable to aircraft with a maximum take-off mass of 5 700 kg or below,

		— 145.A.30(h)(2); (e) the provisions of Annex III, as applicable to aircraft with a maximum take-off mass above 5 700 kg until 28 September 2005; (f) the provisions of Annex III, as applicable to aircraft with a maximum take-off mass of 5 700 kg or below until 28 September 2006 ; (g) for aircraft not involved in commercial air transport other than large aircraft, the need to comply with Annex III (Part 66) in the following provisions, until 28 September 2011: — M.A.606(g) and M.A.801(b)2 of Annex I (Part-M), — 145.A.30(g) and (h) of Annex II (Part-145); (h) for the maintenance of piston-engine non-pressurised aeroplanes of 2000 kg MTOM and below not involved in commercial air transport: (i) until 28 September 2012, the requirement for the competent authority to issue aircraft maintenance licences in accordance with Annex III (Part-66), as new or as converted pursuant to point 66.A.70 of this Annex; (ii) until 28 September 2014, the requirement to have certifying staff qualified in accordance with Annex III (Part-66) contained in the following provisions: — M.A.606(g) and M.A.801(b)2 of Annex I (Part-M), — 145.A.30(g) and (h) of Annex II (Part-145); (i) for the maintenance of ELA1 aeroplanes not involved in commercial air transport, until 28 September 2015: (i) the requirement for the competent authority to issue aircraft maintenance licences in accordance with Annex III (Part-66), as new or as converted pursuant to point 66.A.70 of this Annex; (ii) the requirement to have certifying staff qualified in accordance with Annex III (Part-66) contained in the following provisions: — M.A.606(g) and M.A.801(b)2 of Annex I (Part-M), — 145.A.30(g) and (h) of Annex II (Part-145). 4. Member States may issue approvals with regard to Annex II and Annex IV of a limited duration until 28 September 2007 . 5. When a Member State makes use of the provisions of paragraphs 3 or 4 it shall notify the Commission and the Agency. 6. The Agency shall make an evaluation of the implication of the provisions of Annex I to this Regulation with a view to submitting an opinion to the Commission, including possible amendments to it, before 28 March 2005. 7. By way of derogation from paragraph 1: (a) the provisions of point M.A.706(k) of Annex I (Part-M) shall apply as from 28 September 2010; (b) the provisions of point 7.7 of Appendix I to Annex III (Part-66) shall apply as from 28 September 2010; (c) maintenance organisations approved in accordance with Section A of subpart F of Annex I (Part-M) or Section A of Annex II (Part-145) may continue to issue Authorised Release Certificates by using the EASA Form 1 original issue, as laid down in Appendix II to the Annex I (Part-M) as well as Appendix I to the Annex II (Part 145), until 28 September 2010; (d) competent authorities may continue to issue certificates, previous issue, as laid down in Appendices III, V and VI to Annex I (Part- M), Appendix III to Annex II (Part-145), Appendix V to Annex III (Part-66) or Appendix II to Annex IV (Part-147) to Regulation (EC) No 2042/2003 in force prior to the entry into force of this regulation, until 28 September 2010.

		8. For the purpose of time limits contained in points 66.A.25, 66.A.30 and Appendix III of Annex III (Part-66) related to basic knowledge examinations, basic experience, theoretical type training and examinations, practical training and assessment, type examinations and on the job training completed before this Regulation applies, the origin of time shall be the date by which this Regulation applies. 9. The Agency shall submit an opinion to the Commission including proposals for a simple and proportionate system for the licensing of certifying staff involved in the maintenance of ELA1 aeroplanes as well as aircraft other than aeroplanes and helicopters.
	The territorial range:	This Regulation shall be binding in its entirety and directly applicable in all Member States.
	Scope of regulation /standard:	1. This Regulation establishes common technical requirements and administrative procedures for ensuring the continuing airworthiness of aircraft, including any component for installation thereto, which are: (a) registered in a Member State; or (b) registered in a third country and used by an operator for which a Member State ensures oversight of operations. 2. Paragraph 1 shall not apply to aircraft the regulatory safety oversight of which has been transferred to a third country and which are not used by a Community operator, or to aircraft referred to in Annex II to the basic Regulation. 3. The provisions of this Regulation related to commercial air transport are applicable to licensed air carriers as defined by Community law.
	Documents issued under that legislation:	This Regulation has four Annexes: Annex I: Part-M – Continuing Airworthiness Requirements Annex II: Part-145 – Maintenance Organisation Approvals Annex III: Part-66 – Certifying Staff Annex IV: Part-147 – Training Organisation Approvals
	Note:	The above “Date of entry into force” is consolidated version of this date by Amendments to (EC) No 2042/2003.

Appendix A.3 Air Crew

Commission Regulation (EU) No 1178/2011 with four Annexes

A3.1	Name of document:	COMMISSION REGULATION (EU) No 1178/2011 of 3 November 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.
	Authority that issued the document:	THE EUROPEAN COMMISSION (EU)
	Date and place of publication:	Brussels, 03 November 2011
	Date of entry into force:	1. This Regulation shall enter into force on the 20th day following its publication in the *Official Journal of the European Union*. It shall apply from 8 April 2012. 2. By way of derogation from paragraph 1, Member States may decide not to apply the following provisions of Annex I until 8 April 2015: (a) the provisions related to pilot licences of powered-lift aircraft, airships, balloons and sailplanes; (b) the provisions of Subpart B; (c) the provisions of points FCL.800, FCL.805, FCL.815 and FCL.820; (d) in the case of helicopters, the provisions of Section 8 of Subpart J; (e) the provisions of Sections 10 and 11 of Subpart J. 3. By way of derogation from paragraph 1, Member States may decide not to convert non-JAR-compliant aeroplane and helicopter licences that they have issued until 8 April 2014. 4. By way of derogation from paragraph 1, Member States may decide not to apply the provisions of this Regulation to pilots holding a licence and associated medical certificate issued by a third country involved in the non-commercial operation of aircraft specified in Article 4(1)(b) or (c) of Regulation (EC) No 216/2008 until 8 April 2014. 5. By way of derogation from paragraph 1, Member States may decide not to apply the provisions of Section 3 of Subpart B of Annex IV until 8 April 2015. 6. By way of derogation from paragraph 1, Member States may decide not to apply the provisions of Subpart C of Annex IV until 8 April 2014. 7. When a Member State makes use of the provisions of paragraphs 2 to 6 it shall notify the Commission and the Agency. This notification shall describe the reasons for such derogation as well as the programme for implementation containing actions envisaged and related timing.
	The territorial range:	This Regulation shall be binding in its entirety and directly applicable in all Member States.
	Scope of regulation /standard:	This Regulation lays down detailed rules for: (1) different ratings for pilots' licences, the conditions for issuing, maintaining, amending, limiting, suspending or revoking licences, the privileges and responsibilities of the holders of licences, the conditions for the conversion of existing national pilots' licences and of national flight engineers' licences into pilots' licences, as well as the conditions for the acceptance of licences from third countries; (2) the certification of persons responsible for providing flight training or flight simulation training and for assessing pilots' skills; (3) different medical certificates for pilots, the conditions for issuing,

		maintaining, amending, limiting, suspending or revoking medical certificates, the privileges and responsibilities of the holders of medical certificates as well as the conditions for the conversion of national medical certificates into commonly recognised medical certificates; (4) the certification of aero-medical examiners, as well as the conditions under which general medical practitioners may act as aero-medical examiners; (5) the periodical aero-medical assessment of cabin crew members, as well as the qualification of persons responsible for this assessment.
	Documents issued under that legislation:	This Regulation has four Annexes: Annex I: Part-FCL – Flight Crew Licensing Annex II: Conditions for the conversion of existing national licences and ratings for aeroplanes and helicopters Annex III: Conditions for the acceptance of licences issued by or behalf or third countries Annex IV: Part-MED – Medical requirements

Commission Regulation (EU) N° 290/2012 with three Annexes

A3.2	Name of document:	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.
	Authority that issued the document:	THE EUROPEAN COMMISSION (EU)
	Date and place of publication:	Brussels, 30 March 2012
	Date of entry into force:	1. This Regulation shall enter into force on the 20th day following its publication in the *Official Journal of the European Union*. It shall apply from 8 April 2012. 2. By way of derogation from the second subparagraph of paragraph 1, Member States may decide not to apply the following provisions: (a) Annexes V to VII until 8 April 2013; (b) point ORA.GEN.200(a)(3) of Annex VII to FSTD qualification certificate holders not being an approved training organisation and not holding an air operator certificate until 8 April 2014; (c) Annexes VI and VII to non-JAR-compliant approved training organisations and aero-medical centres until 8 April 2014; (d) point CC.GEN.030 of Annex V until 8 April 2015; (e) Annex V to cabin crew members involved in commercial operations by helicopters until 8 April 2015; (f) Annexes VI and VII to training organisations providing training only for the light aircraft pilot licence, private pilot licence, balloon pilot licence or sailplane pilot licence until 8 April 2015; (g) Annexes VI and VII to training organisations providing training for flight test ratings in accordance with point FCL.820 of Annex I to Regulation (EU) No 1178/2011 until 8 April 2015. 3. When a Member State makes use of the provisions of paragraph 2, it shall notify the Commission and the Agency. This notification shall describe the duration and the reasons for such derogation as well as the programme for

		implementation containing actions envisaged and related timing.
	The territorial range:	This Regulation shall be binding in its entirety and directly applicable in the Member States in accordance with the Treaties.
	Scope of regulation /standard:	This Regulation lays down detailed rules for: qualification of cabin crew involved in commercial air transport operations, authority requirements for aircrew, and organisation requirements for aircrew.
	Documents issued under that legislation:	This Regulation has three Annexes (V - VII): Annex V: Part-CC – Qualification of Cabin Crew Involved in Commercial Air Transport Operations Annex VI: Part-ARA - Authority Requirements for Aircrew Annex VII: Part-ORA – Organisation Requirements for Aircrew

Appendix A.4 Air Operations

Commission Regulation (EU) No 965/2012 with five Annexes

A4.1.1	Name of document:	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.
	Authority that issued the document:	THE EUROPEAN COMMISSION (EU)
	Date and place of publication:	Brussels, 05 October 2012
	Date of entry into force:	1. This Regulation shall enter into force on the third day following that of its publication in the *Official Journal of the European Union*. It shall apply from 28 October 2012. 2. By way of derogation from the second subparagraph of paragraph 1, Member States may decide not to apply the provisions of Annexes I to V until 28 October 2014. When a Member State makes use of that possibility, it shall notify the Commission and the Agency. This notification shall describe the reasons for such derogation and its duration as well as the programme for implementation containing actions envisaged and related timing.
	The territorial range:	This Regulation shall be binding in its entirety and directly applicable in all Member States.
	Scope of regulation /standard:	1. This Regulation lays down detailed rules for commercial air transport operations with aeroplanes and helicopters, including ramp inspections of aircraft of operators under the safety oversight of another State when landed at aerodromes located in the territory subject to the provisions of the Treaty. 2. This Regulation also lays down detailed rules on the conditions for issuing, maintaining, amending, limiting, suspending or revoking the certificates of operators of aircraft referred to in Article 4(1)(b) and (c) of Regulation (EC) No 216/2008 engaged in commercial air transport operations, the privileges and responsibilities of the holders of certificates as well as conditions under which operations shall be prohibited, limited or subject to certain conditions in the interest of safety. 3. This Regulation shall not apply to air operations within the scope of Article 1(2)(a) of Regulation (EC) No 216/2008.
	Documents issued under that legislation:	This Regulation has five Annexes (I - V): Annex I – Definitions for terms used in Annexes II to V Annex II – Part-ARO (Authority requirements for air operations) Annex III – Part-ORO (Organization requirements for air operations) Annex IV – Part-CAT (Commercial air transport operations) Annex V – Part-SPA (Specific approvals)

Forthcoming Requirements

A4.2.1	Name of document:	COMMENT RESPONSE DOCUMENT (CRD) TO NOTICE OF PROPOSED AMENDMENT (NPA) 2009-02b for a draft Agency Opinion on a Commission Regulation establishing the Implementing Rules for air operations of Community operators (…).
	Authority that issued the document:	THE EXECUTIVE DIRECTOR OF THE AGENCY
	Date and place of publication:	30 August 2011
	Date of entry into force:	n/a
	Scope of regulation /standard:	This CRD package contains the following documents: Draft Annex VI – Part-NCC, technical requirements for non-commercial operations of complex motor-powered aircraft (aeroplanes and helicopters), and Draft Annex VII – Part-NCO, technical requirements for non-commercial operations of other-than-complex motor-powered aircraft (aeroplanes, helicopters, sailplanes, balloons)
	Documents issued under that legislation:	Draft: Annex VI – Part-NCC (Non-commercial operations with complex motor-powered aircraft) Annex VII – Part-NCO (non-commercial operations with other-then-complex motor-powered aircraft)
A4.2.2	*Name of document:*	*COMMENT RESPONSE DOCUMENT (CRD) TO NOTICE OF PROPOSED AMENDMENT (NPA) 2009-02b for a draft Agency Opinion on a Commission Regulation establishing the Implementing Rules for air operations of Community operators (…).*
	Authority that issued the document:	THE EXECUTIVE DIRECTOR OF THE AGENCY
	Date and place of publication:	27 October 2011
	Date of entry into force:	n/a
	Scope of regulation /standard:	This CRD package contains the following documents: Draft Annex VIII – Part-SPO, Specialized operations, e.g. aerial work, display flights Draft GM to Part-SPO Draft AMC to Part-SPO
	Documents issued under that legislation:	Draft: Annex VIII – Part-SPO, Specialized operations, e.g. aerial work, display flights GM to Part-SPO AMC to Part-SPO

Forthcoming Regulation for Third Country Operators

A4.3.1	Name of document:	COMMENT RESPONSE DOCUMENT (CRD) TO NOTICE OF PROPOSED AMENDMENT (NPA) 2011-05 for a draft Agency Opinion for a Commission Regulation establishing the Implementing Rules on Third Country Operators for Commercial Air Transport (…).
	Authority that issued the document:	THE EXECUTIVE DIRECTOR OF THE AGENCY
	Date and place of publication:	26 January 2011
	Date of entry into force:	n/a
	Scope of regulation /standard:	This CRD package contains the following documents: Draft Annex I – Part-AR, Authority Requirements Draft Annex II – Part TCO, Third Country Operators requirements Draft AMC to Part-TCO Draft GM to Part-TCO
	Documents issued under that legislation:	Draft: Annex I – Part-AR, Authority Requirements Annex II – Part TCO, Third Country Operators requirements AMC to Part-TCO GM to Part-TCO

Appendix A.5 ATM/ANS

Appendix A.5.1 ATM/ANS Oversight

A5.1.1	Name of document:	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.
	Authority that issued the document:	THE EUROPEAN COMMISSION (EU)
	Date and place of publication:	Brussels, 17 October 2011
	Date of entry into force:	This Regulation shall enter into force on the twentieth day following that of its publication in the *Official Journal of the European Union* (07/11/2011).
	The territorial range:	This Regulation shall be binding in its entirety and directly applicable in all Member States.
	Scope of regulation /standard:	1. This Regulation establishes requirements to be applied to the exercise of the safety oversight function by competent authorities concerning air navigation services, air traffic flow management (ATFM), airspace management (ASM) for general air traffic and other network functions. 2. This Regulation shall apply to the activities of competent authorities and qualified entities acting on their behalf regarding the safety oversight of air navigation services, ATFM, ASM and other network functions.
	Documents issued under that legislation:	n/a
	Note:	Regulation (EC) No 1315/2007 is repealed.
A5.1.2	Name of document:	REGULATION (EC) No 1070/2009 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 21 October 2009 amending Regulations (EC) No 549/2004, (EC) No 550/2004, (EC) No 551/2004 and (EC) No 552/2004 in order to improve the performance and sustainability of the European aviation system
	Authority that issued the document:	THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION
	Date and place of publication:	Strasbourg, 21 October 2009
	Date of entry into force:	This Regulation shall enter into force on the 20th day following its publication in the Official Journal of the European Union. Article 6(2) and (6) of Regulation (EC) No 551/2004, as amended by this Regulation, shall apply from the date specified in their respective implementing rules but no later than 4 December2012.
	The territorial range:	This Regulation shall be binding in its entirety and directly applicable in all Member States.
	Scope of regulation /standard:	Amendment to the Regulation (EC) No 549/2004, (EC) No 550/2004, (EC) No 551/2004 and (EC) No 552/2004
	Documents issued under that legislation:	n/a
A5.1.3	Name of document:	COMMISSION REGULATION (EC) No 2150/2005 of 23 December 2005 laying down common rules for the flexible use of airspace

	Authority that issued the document:	THE COMMISSION OF THE EUROPEAN COMMUNITIES
	Date and place of publication:	Brussels, 23 December 2005
	Date of entry into force:	This Regulation shall enter into force on the twentieth day following that of its publication in the Official Journal of the European Union. Article 6 shall apply 12 months after the day of entry into force of this Regulation.
	The territorial range:	This Regulation shall be binding in its entirety and directly applicable in all Member States.
	Scope of regulation /standard:	This Regulation reinforces and harmonises the application, within the Single European Sky, of the concept of the flexible use of airspace as defined in Article 2 point (22) of Regulation (EC) No 549/2004, in order to facilitate airspace management and air traffic management within the limits of the common transport policy. In particular, this Regulation sets out rules to ensure better cooperation between civil and military entities responsible for air traffic management that operate in the airspace under the responsibility of Member States.
	Documents issued under that legislation:	ANNEX - List of Elements Required for the Annual Report on the Application of the Flexible Use of Airspace
A5.1.4	Name of document:	REGULATION (EC) No 552/2004 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 10 March 2004 on the interoperability of the European Air Traffic Management network (the interoperability Regulation) Amended by: Regulation (EC) No 1070/2009 of the European Parliament and of the Council of 21 October 2009
	Authority that issued the document:	THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION
	Date and place of publication:	Strasbourg, 10 March 2004.
	Date of entry into force:	This Regulation shall enter into force on the twentieth day following that of its publication in the Official Journal of the European Union.
	The territorial range:	This Regulation shall be binding in its entirety and directly applicable in all Member States.
	Scope of regulation /standard:	1. Within the scope of the framework Regulation, this Regulation concerns the interoperability of the EATMN. 2. This Regulation shall apply to the systems, their constituents and associated procedures identified in Annex I. 3. The objective of this Regulation is to achieve interoperability between the different systems, constituents and associated procedures of the EATMN, taking due account of the relevant international rules. This Regulation aims also at ensuring the coordinated and rapid introduction of new agreed and validated concepts of operations or technology in air traffic management.
	Documents issued under that legislation:	ANNEX I - List of Systems for Air Navigation Services ANNEX II – Essential Requirements ANNEX III - Constituents ANNEX IV - Systems ANNEX V - Notified Bodies

	Note:	Directives 93/65/EEC and 97/15/EC and Regulations (EC) No-s 2082/2000 and 980/2002 shall be repealed on 20 October 2005.
A5.1.5	Name of document:	REGULATION (EC) No 551/2004 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 10 March 2004 on the organisation and use of the airspace in the single European sky Amended by: Regulation (EC) No 1070/2009 of the European Parliament and of the Council of 21 October 2009
	Authority that issued the document:	THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION
	Date and place of publication:	Strasbourg, 10 March 2004
	Date of entry into force:	This Regulation shall enter into force on the 20th day following that of its publication in the Official Journal of the European Union.
	The territorial range:	This Regulation shall be binding in its entirety and directly applicable in all Member States.
	Scope of regulation /standard:	1. Within the scope of the framework Regulation, this Regulation concerns the organisation and the use of airspace in the Single European Sky. The objective of this Regulation is to support the concept of a progressively more integrated operating airspace within the context of the common transport policy and to establish common procedures for design, planning and management ensuring the efficient and safe performance of air traffic management. 2. The use of airspace shall support the operation of the air navigation services as a coherent and consistent whole in accordance with Regulation (EC) No 550/2004 of the European Parliament and of the Council of 10 March 2004 on the provision of air navigation services in the single European sky (the service provision Regulation). 3. Without prejudice to Article 10, this Regulation shall apply to the airspace within the ICAO EUR and AFI regions where Member States are responsible for the provision of air traffic services in accordance with the service provision Regulation. Member States may also apply this Regulation to airspace under their responsibility within other ICAO regions, on condition that they inform the Commission and the other Member States thereof. 4. The Flight Information Regions comprised within the airspace to which this Regulation applies shall be published in the Official Journal of the European Union.
	Documents issued under that legislation:	n/a
A5.1.6	Name of document:	REGULATION (EC) No 550/2004 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 10 March 2004 on the provision of air navigation services in the single European sky (the service provision Regulation) Amended by: Regulation (EC) No 1070/2009 of the European Parliament and of the Council of 21 October 2009
	Authority that issued the document:	THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION

	Date and place of publication:	Strasbourg, 10 March 2004.
	Date of entry into force:	1. This Regulation shall enter into force on the 20th day following that of its publication in the Official Journal of the European Union. 2. However, Articles 7 and 8 shall enter into force one year after publication of the common requirements, as referred to in Article 6, in the Official Journal of the European Union.
	The territorial range:	This Regulation shall be binding in its entirety and directly applicable in all Member States.
	Scope of regulation /standard:	1. Within the scope of the framework Regulation, this Regulation concerns the provision of air navigation services in the single European sky. The objective of this Regulation is to establish common requirements for the safe and efficient provision of air navigation services in the Community. 2. This Regulation shall apply to the provision of air navigation services for general air traffic in accordance with and within the scope of the framework Regulation.
	Documents issued under that legislation:	ANNEX I - Requirements for Qualified Entities ANNEX II – Conditions to be Attached to Certificates
A5.1.7	Name of document:	REGULATION (EC) No 549/2004 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 10 March 2004 laying down the framework for the creation of the single European sky (the framework Regulation) Amended by: Regulation (EC) No 1070/2009 of the European Parliament and of the Council of 21 October 2009
	Authority that issued the document:	THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION
	Date and place of publication:	Strasbourg, 10 March 2004.
	Date of entry into force:	This Regulation entered into force on the twentieth day following that of its publication in the Official Journal of the European Union.
	The territorial range:	This Regulation shall be binding in its entirety and directly applicable in all Member States.
	Scope of regulation /standard:	1. The objective of the single European sky initiative is to enhance current air traffic safety standards, to contribute to the sustainable development of the air transport system and to improve the overall performance of air traffic management (ATM) and air navigation services (ANS) for general air traffic in Europe, with a view to meeting the requirements of all airspace users. This single European sky shall comprise a coherent pan-European network of routes, network management and air traffic management systems based only on safety, efficiency and technical considerations, for the benefit of all airspace users. In pursuit of this objective, this Regulation establishes a harmonised regulatory framework for the creation of the single European sky. 2. The application of this Regulation and of the measures referred to in Article 3 shall be without prejudice to Member States' sovereignty over their airspace and to the requirements of the Member States relating to public order, public security and defence matters, as set out in Article 13. This Regulation and the measures referred to in Article 3 do not cover military

		operations and training. 3. The application of this Regulation and of the measures referred to in Article 3 shall be without prejudice to the rights and duties of Member States under the 1944 Chicago Convention on International Civil Aviation (the Chicago Convention). In this context, an additional objective of this Regulation is, in the fields it covers, 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 these provisions are duly taken into account in this Regulation and in the rules drawn up for its implementation. 4. The application of this Regulation to the airport of Gibraltar is understood to be without prejudice to the respective legal positions of the Kingdom of Spain and the United Kingdom of Great Britain and Northern Ireland with regard to the dispute over sovereignty over the territory in which the airport is situated.
	Documents issued under that legislation:	n/a

Appendix A.5.2 ATCO - Air Traffic Controllers

A5.2.1	Name of document:	COMMISSION REGULATION (EU) No 805/2011 of 10 August 2011 laying down detailed rules for air traffic controllers' licences and certain certificates pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council.
	Authority that issued the document:	THE EUROPEAN COMMISSION (EU)
	Date and place of publication:	Brussels, 10 August 2011
	Date of entry into force:	This Regulation was entered into force on the twentieth day following that of its publication in the *Official Journal of the European Union* (31/08/2011).
	The territorial range:	This Regulation shall be binding in its entirety and directly applicable in all Member States.
	Scope of regulation /standard:	1. This Regulation lays down detailed rules for the issue, suspension, and revocation of licences of air traffic controllers and student air traffic controllers, of associated ratings, endorsements, medical certificates and of certificates of training organisations and the conditions of their validity, renewal, revalidation and use. 2. This Regulation shall apply to: (a) student air traffic controllers, (b) air traffic controllers exercising their functions within the scope of Regulation (EC) No 216/2008, and (c) persons and organisations involved in the licensing, training, testing, checking or medical assessment of applicants in accordance with this Regulation. 3. Subject to Article 1(3) of Regulation (EC) No 216/2008, Member States shall, as far as practicable, ensure that services provided or made available by military personnel to the public referred to in Article 1(2)(c) of that Regulation offer a level of safety that is at least equivalent to the level required by the essential requirements as defined in Annex Vb of that Regulation. 4. With the objective to achieve a harmonised level of safety within the European airspace, Member States may decide to apply this Regulation to their military personnel providing services to the public referred to in Article 1(2)(c) of that Regulation. 5. Air traffic control services within the scope of Regulation (EC) No 216/2008 shall only be provided by air traffic controllers licensed in accordance with this Regulation.
	Documents issued under that legislation:	This Regulation has four Annexes (I - IV): Annex I – Specifications for licences Annex II – Training requirements Annex III – Requirements for proficiency in languages Annex IV – Specifications for the certificates of training organisations

Appendix A.5.3 AUR and ACAS II

A5.3.1	Name of document:	COMMISSION REGULATION (EU) No 1332/2011 of 16 December 2011 laying down common airspace usage requirements and operating procedures for airborne collision avoidance.
	Authority that issued the document:	THE EUROPEAN COMMISSION (EU)
	Date and place of publication:	Brussels, 16 December 2011
	Date of entry into force:	1. This Regulation was entered into force on the 20th day following its publication in the *Official Journal of the European Union* (09/01.2012). 2. Articles 3 and 4 shall apply as of 1 March 2012. 3. By way of derogation from paragraph 2, in the case of aircraft with an individual certificate of airworthiness issued before 1 March 2012, the provisions of Article 3 and 4 shall apply as of 1 December 2015.
	The territorial range:	This Regulation shall be binding in its entirety and directly applicable in all Member States.
	Scope of regulation /standard:	This Regulation lays down common airspace usage requirements and operating procedures for airborne collision avoidance to be fulfilled by: (a) operators of aircraft referred to under Article 4(1)(b) and (c) of Regulation (EC) No 216/2008 undertaking flights into, within or out of the Union; and (b) operators of aircraft referred to under Article 4(1)(d) of Regulation (EC) No 216/2008 undertaking flights within the airspace above the territory to which the Treaty applies as well as in any other airspace where Member States apply Regulation (EC) No 551/2004 of the European Parliament and of the Council (2).
	Documents issued under that legislation:	Annex: Part-ACAS – Airborne collision avoidance systems (ACAS) II.

Appendix A.5.4 SERA

A5.4.1	Name of document:	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.
	Authority that issued the document:	THE EUROPEAN COMMISSION (EU)
	Date and place of publication:	Brussels, 26 September 2012
	Date of entry into force:	1. This Regulation was entered into force on the twentieth day following that of its publication in the *Official Journal of the European Union*. It shall apply from 4 December 2012. 2. By way of derogation from the second subparagraph of paragraph 1, Member States may decide not to apply the provisions of this Regulation until 4 December 2014. When a Member State makes use of that possibility, it shall notify to the Commission and EASA in accordance with Article 12(1) of Regulation (EC) No 549/2004, the reasons for that derogation, its duration, as well as the envisaged and related timing of implementation of this Regulation.
	The territorial range:	This Regulation shall be binding in its entirety and directly applicable in all Member States.
	Scope of regulation /standard:	1. The objective of this Regulation is to establish the common rules of the air and operational provisions regarding services and procedures in air navigation that shall be applicable to general air traffic within the scope of Regulation (EC) No 551/2004. 2. This Regulation shall apply in particular to airspace users and aircraft engaged in general air traffic: (a) operating into, within or out of the Union; (b) bearing the nationality and registration marks of a Member State of the Union, and operating in any airspace to the extent that they do not conflict with the rules published by the country having jurisdiction over the territory overflown. 3. This Regulation shall also apply to the Competent Authorities of the Member States, Air Navigation Service Providers and the relevant ground personnel engaged in aircraft operations.
	Documents issued under that legislation:	ICAO Annex 2: “Rules of the air”
A5.4.2	Name of document:	COMMISSION IMPLEMENTING REGULATION (EU) No 1216/2011 of 24 November 2011 amending Commission Regulation (EU) No 691/2010 laying down a performance scheme for air navigation services and network functions
	Authority that issued the document:	THE EUROPEAN COMMISSION (EU)
	Date and place of publication:	Brussels, 24 November 2011

	Date of entry into force:	This Regulation entered into force on the 20th day following its publication in the Official Journal of the European Union.
	The territorial range:	This Regulation shall be binding in its entirety and directly applicable in all Member States.
	Scope of regulation /standard:	Amendment to the Regulation (EU) No 691/2010.
	Documents issued under that legislation:	n/a
A5.4.3	Name of document:	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
	Authority that issued the document:	THE EUROPEAN COMMISSION (EU)
	Date and place of publication:	Brussels, 17 October 2011
	Date of entry into force:	This Regulation was entered into force on the 20th day following its publication in the Official Journal of the European Union.
	The territorial range:	This Regulation shall be binding in its entirety and directly applicable in all Member States.
	Scope of regulation /standard:	This Regulation lays down the common requirements for the provision of air navigation services. However, unless Annex I or II makes provision to the contrary, those common requirements shall not apply to: (a) activities other than the provision of air navigation services by a provider of such services; (b) resources allocated to activities outside the provision of air navigation services.
	Documents issued under that legislation:	ANNEX I - General requirements for the provision of air navigation services ANNEX II - Specific requirements for the provision of air traffic services ANNEX III - Specific requirements for the provision of meteorological services ANNEX IV - Specific requirements for the provision of aeronautical information services ANNEX V - Specific requirements for the provision of communication, navigation or surveillance services
	Note:	Regulation (EC) No 2096/2005 is repealed.
A5.4.4	Name of document:	REGULATIONS COMMISSION REGULATION (EU) No 691/2010 of 29 July 2010 laying down a performance scheme for air navigation services and network functions and amending Regulation (EC) No 2096/2005 laying down common requirements for the provision of air navigation services
	Authority that issued the document:	THE EUROPEAN COMMISSION (EU)
	Date and place of publication:	Brussels, 29 July 2010
	Date of entry into force:	1. This Regulation entered into force on the 20th day following its publication in the Official Journal of the European Union. 2. Chapter V shall apply as from 1 January 2011. The first reference period

		shall start from 1 January 2012.
	The territorial range:	This Regulation shall be binding in its entirety and directly applicable in all Member States.
	Scope of regulation /standard:	1. This Regulation lays down the necessary measures to improve the overall performance of air navigation services and network functions for general air traffic within the ICAO EUR and AFI regions where Member States are responsible for the provision of air navigation services with a view to meeting the requirements of all airspace users. 2. For the purpose of target setting, this Regulation shall apply to the air navigation services provided by air traffic service providers designated in accordance with Article 8 of Regulation (EC) No 550/2004 of the European Parliament and of the Council (4) and by providers of meteorological services, if designated in accordance with Article 9(1) of that Regulation. 3. Member States may decide not to apply this Regulation to terminal air navigation services provided at airports with less than 50 000 commercial air transport movements per year. They shall inform the Commission thereof. Where none of the airports in a Member State reaches the threshold of 50 000 commercial air transport movements per year, performance targets shall apply as a minimum to the airport with the highest commercial air transport movements. 4. Where a Member State considers that some or all of its terminal air navigation services are submitted to market conditions it shall assess in accordance with the procedures laid down in Article 1(6) of Regulation (EC) No 1794/2006, and with the support of the national supervisory authority, no later than 12 months before the start of each reference period, whether the conditions laid down in Annex I of that Regulation are met. Where the Member State finds that these conditions are met, regardless of the number of commercial air transport movements served, it may decide not to set determined costs under that Regulation nor apply binding targets to the cost efficiency of those services. 5. Pursuant to Article 11(6)(c)(ii) of Regulation (EC) No 549/2004 and Article 15(2)(a) and (b) of Regulation (EC) No 550/2004, and without prejudice to Article 4(2) of the present Regulation, target setting on cost-efficiency shall apply to all determined costs chargeable to airspace users. 6. Member States may also apply this Regulation: (a) in airspace under their responsibility within other ICAO regions, on condition that they inform the Commission and the other Member States thereof, and without prejudice to the rights and duties of Member States under the 1944 Chicago Convention on international civil aviation (the Chicago Convention); (b) to providers of air navigation services which have received the permission to provide air navigation services without certificate, in accordance with Article 7(5) of Regulation (EC) No 550/2004. 7. Notwithstanding the protection of information provisions of Directive 2003/42/EC of the European Parliament and of the Council and its implementing Regulations Commission Regulations (EC) No 1321/2007 and (EC) No 1330/2007, the requirements related to the provision of data as defined in Chapter V shall apply to national authorities, air navigation service providers, airport operators, airport coordinators and air carriers under the conditions set out in Annex IV.
	Documents issued	ANNEX I - Key Performance Indicators (KPI)

	under that legislation:	ANNEX II - Template for Performance Plans ANNEX III – Principles to Assess Consistency between European Union-Wide and National or Functional Airspace Block Performance Targets ANNEX IV - List of Data to be Provided for the Purpose of his Regulation
A5.4.5	Name of document:	COMMISSION REGULATION (EU) No 255/2010 of 25 March 2010 laying down common rules on air traffic flow management
	Authority that issued the document:	THE EUROPEAN COMMISSION (EU)
	Date and place of publication:	Brussels, 25 March 2010
	Date of entry into force:	This Regulation was entered into force on the 20th day following its publication in the Official Journal of the European Union. It shall apply from 26 September 2011.
	The territorial range:	This Regulation shall be binding in its entirety and directly applicable in all Member States.
	Scope of regulation /standard:	1. This Regulation lays down the requirements for air traffic flow management (hereinafter ATFM) in order to optimise the available capacity of the European air traffic management network (hereinafter EATMN) and enhance ATFM processes. 2. This Regulation shall apply within the airspace referred to in Article 1(3) of Regulation (EC) No 551/2004 to: (a) all flights intended to operate or operating as general air traffic and in accordance with the instrument flight rules (hereinafter IFR) in whole or in part; (b) all phases of flights referred to in point (a) and air traffic management. 3. This Regulation shall apply to the following parties, or agents acting on their behalf, involved in ATFM processes: (a) operators of aircraft, (b) air traffic service (hereinafter ATS) units, including ATS reporting offices and aerodrome control services; (c) aeronautical information services; (d) entities involved in airspace management; (e) airport managing bodies; (f) the central unit for ATFM; (g) local ATFM units; (h) slot coordinators of coordinated airports.
	Documents issued under that legislation:	ANNEX - List of the ICAO provisions for the purposes of air traffic flow management
A5.4.6	Name of document:	COMMISSION REGULATION (EC) No 482/2008 of 30 May 2008 establishing a software safety assurance system to be implemented by air navigation service providers and amending Annex II to Regulation (EC) No 2096/2005
	Authority that issued the document:	THE COMMISSION OF THE EUROPEAN COMMUNITIES
	Date and place of publication:	Brussels, 30 May 2008
	Date of entry into force:	This Regulation entered into force on the 20th day following its publication in the Official Journal of the European Union.

		It shall apply from 1 January 2009 to the new software of EATMN systems referred to in Article 1(2), first subparagraph. It shall apply from 1 July 2010 to any changes to the software of EATMN systems referred to in Article 1(2), first subparagraph, in operation by that date.
	The territorial range:	This Regulation shall be binding in its entirety and directly applicable in all Member States.
	Scope of regulation /standard:	1. This Regulation lays down the requirements for the definition and implementation of a software safety assurance system by air traffic service (ATS) providers, entities providing air traffic flow management (ATFM) and air space management (ASM) for general air traffic, and providers of communication, navigation and surveillance (CNS) services. It identifies and adopts the mandatory provisions of the EUROCONTROL Safety Regulatory Requirement — ESARR 6 — entitled 'Software in ATM Systems' issued on 6 November 2003. 2. This Regulation shall apply to the new software and to any changes to the software of the systems for ATS, ASM, ATFM, and CNS. It shall not apply to the software of airborne constituents and to space-based equipment.
	Documents issued under that legislation:	ANNEX I - Requirements applying to the software assurance level referred to in Article 4(2) ANNEX II Part A: Requirements applying to the software safety requirements validity assurance referred to in Article 4(3)(a) Part B: Requirements applying to the software verification assurance referred to in Article 4(3)(b) Part C: Requirements applying to the software configuration management assurances referred to in Article 4(3)(c) Part D: Requirements applying to the software safety requirements traceability assurances referred to in Article 4(3)(d)
A5.4.7	Name of document:	COMMISSION REGULATION (EC) No 1794/2006 of 6 December 2006 laying down a common charging scheme for air navigation services
	Authority that issued the document:	THE COMMISSION OF THE EUROPEAN COMMUNITIES
	Date and place of publication:	Brussels, 6 December 2006
	Date of entry into force:	1. This Regulation was entered into force on the seventh day following that of its publication in the Official Journal of the European Union. 2. This Regulation shall apply from 1 January 2007. However, Member States may defer the application of Articles 9, 10, 12, 13 and 14 in respect of en route charges until 1 January 2008. Member States may defer the application of Article 9 and Articles 11 to 15 in respect of terminal charges until 1 January 2010. If Member States decide to defer application in accordance with the second and third subparagraphs, they shall notify the Commission thereof.
	The territorial range:	This Regulation shall be binding in its entirety and directly applicable in all Member States.

	Scope of regulation /standard:	1. This Regulation lays down the necessary measures for the development of a charging scheme for air navigation services which are consistent with the EUROCONTROL Route Charges System. 2. This Regulation shall apply to air navigation services provided by air traffic service providers designated in accordance with Article 8 of Regulation (EC) No 550/2004 and by providers of meteorological services, if designated in accordance with Article 9(1) of that Regulation, for general air traffic within the ICAO EUR and AFI regions where Member States are responsible for the provision of air navigation services. 3. Member States may apply this Regulation to air navigation services provided in airspace under their responsibility within other ICAO regions, on condition that they inform the Commission and the other Member States thereof. 4. Member States may apply this Regulation to providers of air navigation services which have received permission to provide air navigation services without certification, in accordance with Article 7(5) of the service provision Regulation. 5. Member States may decide not to apply this Regulation to air navigation services provided at airports with less than 50 000 commercial air transport movements per year, regardless of the maximum take-off mass and the number of passenger seats, movements being counted as the sum of take-offs and landings and calculated as an average over the previous three years. Member States shall inform the Commission thereof. The Commission will publish periodically an updated list of exempted airports. 6. Without prejudice to the application of the principles referred to in Articles 14 and 15 of the service provision Regulation, Member States may decide not to calculate terminal charges as stipulated in Article 11 of this Regulation and not to set terminal unit rates as referred to in Article 13 of this Regulation in respect of air navigation services provided at aerodromes with less than 150 000 commercial air transport movements per year, regardless of the maximum take-off mass and the number of passenger seats, movements being counted as the sum of take-offs and landings and calculated as an average over the previous three years. Before taking that decision, Member States shall carry out an assessment of the extent to which the conditions laid down in Annex I including consultation with airspace users' representatives are met. The final assessment as to whether the conditions are met and the decision of the Member State shall be published and communicated to the Commission, giving full reasoning for the Member State's conclusions, including the outcome of the consultation with users.
	Documents issued under that legislation:	ANNEX I - Assessment of the Conditions for the Provision of Air Navigation Services at Airports Falling within Article 1(6) ANNEX II – Transparency of the Cost Base ANNEX III - Specific Transparency Requirements for the Provision of Air Navigation Services at Airports Falling within Article 1(6) ANNEX IV - Calculation of the Enroute Service Units ANNEX V - Calculation of the Terminal Service Units ANNEX VI - Charging Mechanism
A5.4.8	Name of document:	COMMISSION REGULATION (EC) No 1033/2006 of 4 July 2006 laying down the requirements on procedures for flight plans in the pre-flight phase for the single European sky

	Authority that issued the document:	THE COMMISSION OF THE EUROPEAN COMMUNITIES
	Date and place of publication:	Brussels, 4 July 2006
	Date of entry into force:	This Regulation was entered into force on the 20th day following its publication in the Official Journal of the European Union. It shall apply from 1 January 2009.
	The territorial range:	This Regulation shall be binding in its entirety and directly applicable in all Member States.
	Scope of regulation /standard:	1. This Regulation lays down the requirements on procedures for flight plans in the pre-flight phase in order to ensure the consistency of flight plans, repetitive flight plans and associated update messages between operators, pilots and air traffic services units through the Integrated Initial Flight Plan Processing System, either in the period preceding the first delivery of air traffic control clearance for flights taking off from within the airspace covered by this Regulation or in the period preceding entry into that airspace for other flights. 2. This Regulation shall apply to all flights intended to operate or operating as general air traffic in accordance with instrument flight rules within the airspace defined in Article 1(3) of Regulation (EC) No 551/2004. 3. This Regulation shall apply to each of the following parties involved in the submission, modification, acceptance and distribution of flight plans: (a) operators and agents acting on their behalf; (b) pilots and agents acting on their behalf; (c) air traffic services units providing services to general air traffic flying in accordance with instrument flight rules.
	Documents issued under that legislation:	ANNEX - ICAO provisions referred to in Article 3(1)
A5.4.9	Name of document:	COMMISSION REGULATION (EC) No 730/2006 of 11 May 2006 on airspace classification and access of flights operated under visual flight rules above flight level 195
	Authority that issued the document:	THE COMMISSION OF THE EUROPEAN COMMUNITIES
	Date and place of publication:	Brussels, 11 May 2006
	Date of entry into force:	This Regulation was entered into force on the 20th day following its publication in the Official Journal of the European Union. It shall apply from 1 July 2007
	The territorial range:	This Regulation shall be binding in its entirety and directly applicable in all Member States.
	Scope of regulation /standard:	1. This Regulation establishes a harmonised airspace classification to be applied above flight level 195 and lays down harmonised requirements for access of flights operated under visual flight rules to this airspace. 2. In accordance with Article 1(3) of Regulation (EC) No 551/2004, this Regulation shall apply in the airspace within the International Civil Aviation Organisation European (ICAO EUR) and African (ICAO AFI) regions where Member States are responsible for the provision of air traffic services.

Appendix A.6 Occurrence Reporting in Civil Aviation

A6.1	Name of document:	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
	Authority that issued the document:	THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION
	Date and place of publication:	Strasbourg, 20 October 2010
	Date of entry into force:	This Regulation was entered into force on the 20th day following its publication in the Official Journal of the European Union.
	The territorial range:	This Regulation shall be binding in its entirety and directly applicable in all Member States.
	Scope of regulation /standard:	1. This Regulation shall apply to safety investigations into accidents and serious incidents: (a) which have occurred in the territories of the Member States to which the Treaties apply, in accordance with the international obligations of the Member States; (b) involving aircraft registered in a Member State or operated by an undertaking established in a Member State, which have occurred outside the territories of the Member States to which the Treaties apply, when such investigations are not conducted by another State; (c) in which a Member State is entitled, according to international standards and recommended practices, to appoint an accredited representative to participate as a State of Registry, State of the Operator, State of Design, State of Manufacture or State providing information, facilities or experts at the request of the State conducting the investigation; (d) in which a Member State having a special interest by virtue of fatalities or serious injuries to its citizens is permitted by the State conducting the investigation to appoint an expert. 2. This Regulation shall also apply to issues pertaining to the timely availability of information relating to all persons and dangerous goods on board an aircraft involved in an accident and assistance to the victims of air accidents and their relatives. 3. This Regulation shall not apply to safety investigations into accidents and serious incidents which involve aircraft engaged in military, customs, police or similar services, except when the Member State concerned so determines, in accordance with Article 5(4) and national legislation.
	Documents issued under that legislation:	Annex: List of examples of serious incidents
	Note:	Directive 94/56/EC is hereby repealed.
A6.2	Name of document:	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
	Authority that issued the document:	THE COMMISSION OF THE EUROPEAN COMMUNITIES

	Date and place of publication:	Brussels, 24 September 2007
	Date of entry into force:	This Regulation was entered into force on the day following its publication in the Official Journal of the European Union.
	The territorial range:	This Regulation shall be binding in its entirety and directly applicable in all Member States.
	Scope of regulation /standard:	This Regulation lays down measures concerning the dissemination to interested parties of the information on occurrences exchanged by Member States in accordance with Article 6(1) of Directive 2003/42/EC with the objective of providing such parties with the information they need to improve civil aviation safety.
	Documents issued under that legislation:	Annex I: List of Interested Parties; Annex II: Request for Data from European Occurrences Database.
A6.3	Name of document:	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
	Authority that issued the document:	THE COMMISSION OF THE EUROPEAN COMMUNITIES
	Date and place of publication:	Brussels, 12 November 2007
	Date of entry into force:	This Regulation entered into force on the 20th day following its publication in the *Official Journal of the European Union*.
	The territorial range:	This Regulation shall be binding in its entirety and directly applicable in all Member States.
	Scope of regulation /standard:	This Regulation lays down measures concerning the integration into a central repository of relevant safety-related information exchanged by Member States, in accordance with Article 6(1) of Directive 2003/42/EC.
	Documents issued under that legislation:	n/a
A6.4	Name of document:	DIRECTIVE 2003/42/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 13 June 2003 on occurrence reporting in civil aviation
	Authority that issued the document:	THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION
	Date and place of publication:	Luxembourg, 13 June 2003
	Date of entry into force:	This Directive shall enter into force on the day of its publication in the Official Journal of the European Union.
	The territorial range:	This Directive is addressed to the Member States. Member States shall bring into force the laws, regulations and administrative provisions necessary to comply with this Directive before 4 July 2005. They shall forthwith inform the Commission thereof.

	Scope of regulation /standard:	1. This Directive shall apply to occurrences which endanger or which, if not corrected, would endanger an aircraft, its occupants or any other person. A list of examples of these occurrences appears in Annexes I and II. 2. The Commission may, in accordance with the procedure laid down in Article 10(2), decide to amend the Annexes in order to expand upon, or change, the examples. 3. The application of this Directive to the airport of Gibraltar is understood to be without prejudice to the respective legal positions of the Kingdom of Spain and the United Kingdom with regard to the dispute over sovereignty over the territory in which the airport is situated. 4. Application of this Directive to the airport of Gibraltar shall be suspended until the arrangements in the Joint Declaration made by the Foreign Ministers of the Kingdom of Spain and the United Kingdom on 2 December 1987 have come into operation. The Governments of Spain and the United Kingdom will inform the Council of such date of entry into operation.
	Documents issued under that legislation:	ANNEX I: List of aircraft operations, maintenance, repair, and manufacture-related occurrences to be reported; ANNEX II: List of air navigation services related occurrences to be reported.

Forthcoming Regulation

A6.5	Name of document:	Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on occurrence reporting in civil aviation amending Regulation (EU) No 996/2010 and repealing Directive No 2003/42/EC, Commission Regulation (EC) No 1321/2007 and Commission Regulation (EC) No 1330/2007 [COM(2012) 776 final]
	Authority that issued the document:	THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION
	Date and place of publication:	Brussels, 18 December 2012
	Date of entry into force:	n/a
	The territorial range:	This Regulation shall be binding in its entirety and directly applicable in all Member States.
	Scope of regulation /standard:	1. This Regulation aims to improve aviation safety by ensuring that relevant civil aviation safety information is reported, collected, stored, protected, exchanged, disseminated, analysed and that safety actions are taken on the basis of the information collected where appropriate. It also provides for rules concerning the integration of information collected into a European Central Repository and concerning their dissemination to interested parties with the objective of providing such parties with the information they need to improve civil aviation safety. 2. The sole objective of occurrence reporting is the prevention of accidents and incidents and not to attribute blame or liability. This Regulation shall apply to occurrences which endanger or which, if not corrected, would endanger an aircraft, its occupants or any other person. A list of incidents to be reported is detailed in Annex I.

	Documents issued under that legislation:	Annex I: List of Incidents to be Reported under the Mandatory Occurrence Reporting Scheme; Annex II: List of Deadlines and Requirements Applicable to the Mandatory Occurrence Reporting Scheme; Annex III: List of Interested Parties; Annex IV: Request for Information from the European Central Repository.
	Note:	Directive 2003/42/EC, Commission Regulation (EC) No 1321/2007 and Commission Regulation (EC) No 1330/2007 are repealed.

Appendix A.7 ESARRs[5]

A7.1	Name of document:	EUROCONTROL SAFETY REGULATORY REQUIREMENT (ESARR) ESARR 1 SAFETY OVERSIGHT IN ATM, Edition 2.0
	Authority that issued the document:	EUROPEAN ORGANISATION FOR THE SAFETY OF AIR NAVIGATION SAFETY REGULATION COMMISSION
	Date and place of publication:	Brussels, 02-12-2009
	Implementation:	The provisions of this requirement became effective on the day of its approval by the EUROCONTROL Permanent Commission.
	The territorial range:	This requirement applies to Member States of EUROCONTROL. ECAC States who are not Members of EUROCONTROL are also encouraged to apply this requirement.
	Scope of regulation /standard:	This requirement shall apply to all EUROCONTROL Contracting Parties with regards to the operation of their NSAs nominated or established by them to supervise the provision of Air Traffic Services (ATS), Air Traffic Flow Management (ATFM) and Airspace Management (ASM) to General Air Traffic (GAT).
	Documents issued under that legislation:	Attachments: A. Safety Requirements B. Applicable References
	Note:	Pursuant to Regulation (EC) No. 550/2004, the European Commission shall identify and adopt the ESARRs that shall be made mandatory under Community law. Accordingly, Commission Regulation (EC) No. 1315/2007 was developed to transpose the provisions of ESARR 1, Edition 1.0, into Community law.
A7.2	Name of document:	EUROCONTROL SAFETY REGULATORY REQUIREMENT (ESARR) ESARR 2 REPORTING AND ASSESSMENT OF SAFETY OCCURRENCES IN ATM, Edition 3.0
	Authority that issued the document:	EUROPEAN ORGANISATION FOR THE SAFETY OF AIR NAVIGATION SAFETY REGULATION COMMISSION
	Date and place of publication:	Brussels, 02-12-2009

[5] The EUROCONTROL Safety Regulatory Requirements (ESARRs) were developed by the EUROCONTROL Safety Regulation Commission (SRC) with the objective to define and support the achievement of consistent safety levels in the ECAC area.

	Implementation:	1. It is left to each State to decide the best national approach to be adopted to successfully implement this Safety Regulatory Requirement, to encourage a good level of reporting, and to produce reliable safety data. In particular, each State will decide upon the implementation, or not, of a national mandatory and/or voluntary scheme. 2. States shall start collecting the safety data related to accidents and incidents-near collisions as from the 1st January 2000 (refer to Appendix A, Sections 1.1 and 1.2.1). States shall then report on an annual basis, and to EUROCONTROL, national safety indicators related to those categories of occurrences by the 30th March 2001 (refer to Appendix B). 3. States shall start collecting the safety data related to incidents with a potential to become collisions or near collisions, as from the 1st January 2001 (refer to Appendix A, Section 1.2.2). States shall then report on an annual basis, and to EUROCONTROL, national safety indicators related to those incidents, by the 30th March 2002 (refer to Appendix B). 4. States shall start collecting the safety data related to ATM specific occurrences having an impact on the ability to provide safe ATM services, as from the 1st January 2002 (refer to Appendix A, Section 1.3). States shall then report on an annual basis, and to EUROCONTROL, national safety indicators related to those occurrences by the 30th March 2003 (refer to Appendix B).
	The territorial range:	This requirement applies to Member States of EUROCONTROL. ECAC States who are not Members of EUROCONTROL are also encouraged to apply this requirement.
	Scope of regulation /standard:	This requirement covers the implementation by States of an Occurrence Reporting and Assessment Scheme for Air Traffic Management (ATM) safety.
	Documents issued under that legislation:	Appendices: A. ATM-Related Safety Occurrences to be Reported and Analysed B. Annual Summary Report Minimum Contents C. Terms and Definitions – Glossary
	Note:	Transposition of ESARR 2 into Community Law: ESARR 2 ==> Directive 2003/42/EC of the European Parliament and of the Council of 13 June 2003 on occurrence reporting in civil aviation ESARR 2 ==> Council Directive 94/56/EC of 21 November 1994 establishing the fundamental principles governing the investigation of civil aviation accidents and incidents As indicated in the titles, the scope of the Directives is not limited to ATM, but extends to all other sectors of civil aviation, such as aircraft operations, aerodromes etc. However, the ESARR 2 requirements on reporting and investigation of safety occurrences in ATM are covered to a great extent by the provisions of the two Directives.
A7.3	Name of document:	EUROCONTROL SAFETY REGULATORY REQUIREMENT (ESARR) ESARR 3 USE OF SAFETY MANAGEMENT SYSTEMS BY ATM SERVICE PROVIDERS, Edition 1.0
	Authority that issued the document:	EUROPEAN ORGANISATION FOR THE SAFETY OF AIR NAVIGATION SAFETY REGULATION COMMISSION
	Date and place of publication:	Brussels, 17-07-2000
	Implementation:	The provisions of this requirement were to become effective within three years from the date of adoption by the EUROCONTROL Commission.

	The territorial range:	This requirement applies to Member States of EUROCONTROL. ECAC States who are not Members of EUROCONTROL are also encouraged to apply this requirement.
	Scope of regulation /standard:	This requirement concerns the use of safety management systems (SMSs) by providers of Air Traffic Management (ATM) services.
	Documents issued under that legislation:	APPENDIX A: GLOSSARY – TERMS AND DEFINITIONS
	Note:	Transposition of ESARR 3 into Community Law: ESARR 3 ==> Regulation (EC) No 2096/2005 of 20.12.2005 laying down Common Requirements for the Provision of Air Navigation Services. Regulation (EC) No 2096/2005 identifies and adopts the mandatory provisions of ESARR 3 on the use of safety management systems by air traffic management service providers, which is relevant for the certification of air navigation service provider. The Regulation recognises the need of safety management as a function of air traffic services which ensures that all safety risks have been identified, assessed and satisfactorily mitigated. The Common Requirements set specific requirements for air navigation service providers to develop and establish a formal and systematic approach to safety management which will maximise safety benefits in a visible and traceable way, notably through the implementation and operation of a safety management system (SMS).
A7.4	Name of document:	EUROCONTROL SAFETY REGULATORY REQUIREMENT (ESARR) ESARR 4 RISK ASSESSMENT AND MITIGATION IN ATM, Edition 1.0
	Authority that issued the document:	EUROPEAN ORGANISATION FOR THE SAFETY OF AIR NAVIGATION The PERMANENT COMMISSION FOR THE SAFETY OF AIR NAVIGATION
	Date and place of publication:	Brussels, 05-04-2001
	Implementation:	The provisions of this requirement are to become effective within three years from the date of adoption by the EUROCONTROL Commission
	The territorial range:	This requirement applies to Member States of EUROCONTROL. ECAC States who are not Members of EUROCONTROL are also encouraged to apply this requirement.
	Scope of regulation /standard:	1. This requirement concerns the use of a quantitative risk based-approach in Air Traffic Management when introducing and/or planning changes to the ATM System. 2. This requirement covers the human, procedural and equipment (hardware, software) elements of the ATM System as well as its environment of operations. 3. This requirement covers the complete life-cycle of the ATM System, and, in particular, of its constituent parts. 4. This requirement does not address the assessment of introducing and/or planning organisational or management changes to the ATM service provision.
	Documents issued under that legislation:	Appendix A: Risk Classification Scheme Appendix B: Terms and Definitions – Glossary

	Note:	Transposition of ESARR 4 into Community Law: ESARR 4 ==> Regulation (EC) No 2096/2005 of 20.12.2005 laying down Common Requirements for the Provision of Air Navigation Services Regulation (EC) No 2096/2005 identifies and adopts the mandatory provisions of ESARR 4 on risk assessment and mitigation in ATM which is relevant for the certification of air navigation service provider. The Regulation mandates ANS providers to conduct risk assessment and mitigation to an appropriate level in order to ensure the highest possible level of safety of services provided. The Regulation also sets specific requirements for risk assessment and mitigation with regard to changes to the functional ATM system.
A7.5	Name of document:	EUROCONTROL SAFETY REGULATORY REQUIREMENT (ESARR) ESARR 5 ATM SERVICES' PERSONNEL, Edition 2.0
	Authority that issued the document:	EUROPEAN ORGANISATION FOR THE SAFETY OF AIR NAVIGATION The PERMANENT COMMISSION FOR THE SAFETY OF AIR NAVIGATION
	Date and place of publication:	Brussels, 11-04-2002
	Implementation:	The provisions of this requirement are to become effective within three years from the date of their approval by the EUROCONTROL Commission. Accordingly:- • General Requirements for ATM services personnel laid down in section 5.1, with applicability as stated in section 3.1, shall be implemented by 10.11.2003; • Requirements for Air Traffic Controllers laid down in section 5.2, with applicability as stated in section 3.2, shall be implemented by 10.11.2003; • Requirements for Engineering and Technical personnel laid down in section 5.3, with applicability as stated in section 3.3, shall be implemented by 11.04.2005.
	The territorial range:	This requirement applies to Member States of EUROCONTROL. ECAC States who are not Members of EUROCONTROL are also encouraged to apply this requirement.
	Scope of regulation /standard:	This document sets out the general safety regulatory requirements for all ATM services' personnel responsible for safety related tasks within the provision of ATM services across the ECAC area, the safety regulatory requirements for air traffic controllers and the safety regulatory requirements for engineering and technical personnel undertaking operational safety related tasks.
	Documents issued under that legislation:	APPENDIX A - Glossary and Definitions

	Note:	Transposition of ESARR 5 into Community Law: ESARR 5 ==> Directive 2006/23/EC of the European Parliament and of the Council of 5 April 2006 on a Community Air Traffic Controller Licence ESARR 5 ==> Regulation (EC) No 2096/2005 of 20.12.2005 laying down Common Requirements for the Provision of Air Navigation Services *Directive 2006/23/EC on ATCO Licensing* Directive 2006/23/EC of the European Parliament and of the Council provides more detailed legislation concerning the licensing of air traffic controllers, in order to ensure the highest standards of responsibility and competence, to improve the availability of air traffic controllers and to promote the mutual recognition of licences, as envisaged in Article 5 of Regulation (EC) No 550/2004 on the provision of air navigation services in the Single European Sky, while pursuing the objective of an overall improvement in air traffic safety and competence of personnel. *Competency Requirements for Engineering and Technical Personnel* The common requirements for the provision of air navigation services, including requirements on competency of staff involved in the delivery of such services, are established in accordance with the procedure referred to in Article 5(3) of the SES Framework Regulation. Annex II, Section 4, paragraph 3.3 of Regulation (EC) No 2096/2005 sets the safety requirements for ATM services' engineering and technical personnel undertaking operational safety related tasks.
A7.6	Name of document:	EUROCONTROL SAFETY REGULATORY REQUIREMENT (ESARR) ESARR 6 SOFTWARE IN ATM FUNCTIONAL SYSTEMS, Edition 2.0
	Authority that issued the document:	EUROPEAN ORGANISATION FOR THE SAFETY OF AIR NAVIGATION The PERMANENT COMMISSION FOR THE SAFETY OF AIR NAVIGATION
	Date and place of publication:	Brussels, 06 May 2010
	Implementation:	ESARR 6, Edition 1.0, became effective in November 2006 for all EUROCONTROL Member States. Commission Regulation (EC) No. 482/2008 became effective as of 1 January 2009 to the new software of EATMN systems and as of 1 July 2010 to any changes to the software of EATMN systems. Taking into consideration the alignment of both texts and that no new obligations have been introduced by means of this new edition of ESARR 6, the applicability date does not need to be extended beyond the date of its original approval by the EUROCONTROL Permanent Commission. The requirements will already be implemented in Member States either by means of Commission Regulation (EC) No. 482/2008, or national provisions wherever EC legislation is not applicable.
	The territorial range:	This requirement applies to Member States of EUROCONTROL. ECAC States who are not Members of EUROCONTROL are also encouraged to apply this requirement.

	Scope of regulation /standard:	The objectives of ESARR 6 are to: a) The prime software safety objective to be met for ATM functional systems that contain software is to ensure that the risks associated with the use of EATMN software have been reduced to a tolerable level. b) Ensure the applicability of the ESARR 6 requirements to general air traffic in the Member States of EUROCONTROL; c) Support implementation in other ECAC States; d) Support the implementation of the SES by: i) Allowing the development and implementation of software safety assurance systems within the framework of the safety management system of the ATM service providers defined in the SES regulations, ii) Enabling joint civil/military initiatives with regard to software in ATM functional systems in accordance with the existing regulatory framework.
	Documents issued under that legislation:	Attachments: A. Safety Requirements B. Applicable References
	Note:	Transposition of ESARR 6 into Community Law: ESARR6 ==> Regulation (EC) N° 482/2008 of 30 May 2008 establishing a software safety assurance system to be implemented by air navigation service providers and amending Annex II to Regulation (EC) N° 2096/2005. Commission Regulation (EC) 482/2008 has been published in the EU Official Journal on 30th May 2008. This implementing rule transposes ESARR 6 into European Community law in accordance with Article 4 of Regulation (EC) 550/2004 (the Service Provision Regulation). ESARR 6 provides a set of safety regulatory requirements for the use of software in ATM systems. It was approved by the EUROCONTROL Permanent Commission in November 2003 for implementation into the regulatory frameworks of EUROCONTROL Contracting Parties by November 2006. Commission Regulation (EC) 482/2008 is directly applicable in EU Member States and went into force on the 20th day following its publication. It shall apply from 1 January 2009 to the new software of EATMN systems and from 1 July 2010 to any changes to the software of EATMN systems.

Appendix A.8 Airports/Aerodromes

A8.1 Annex 14	Name of document:	ICAO Annex 14 Aerodromes, 4th edition
	Authority that issued the document:	ICAO
	Date and place of publication:	2004
	Date of entry into force:	2004
	Scope of regulation /standard:	Part I of this document contains the Standards that prescribe the physical characteristics and obstacle limitation surfaces to be provided for at aerodromes, and certain facilities and technical services normally provided at an aerodrome. Part II contains Standards and Recommended Practices (specifications) that prescribe the physical characteristics and obstacle limitation surfaces to be provided for at heliports, and certain facilities and technical services normally provided at a heliport. It is not intended that these specifications limit or regulate the operation of an aircraft.
	The territorial range:	191 countries-members
	Documents issued under that legislation:	ICAO Doc 4444 - Air Traffic Management. ICAO Doc 8168 Aircraft Operations ICAO Doc 9137 Airport Services Manual ICAO Doc 9150 Stolport Manual ICAO Doc 9157 Aerodrome Design Manual ICAO Doc 9184 Airport Planning Manual ICAO Doc 9261 Heliport Manual ICAO Doc 9332 Manual on the ICAO Bird Strike Information System (IBIS) ICAO Doc 9426 Air Traffic Service Planning Manual ICAO Doc 9476 Manual of Surface Movement Guidance and Control Systems (SMGCS) ICAO Doc 9640 Manual of Aircraft Ground De-Icing/Anti-Icing Operations ICAO Doc 9643 Manual on Simultaneous Operations on Parallel or Near-Parallel Instrument Runways (SOIR) ICAO Doc 9760 Airworthiness Manual ICAO Doc 9774 Manual on Certification of Aerodromes. ICAO Doc 9829 Guidance on the Balanced Approach to Aircraft Noise Management ICAO Doc 9830 Advanced Surface Movement Guidance and Control Systems (A-SMGCS) Manual ICAO Doc 9859 Safety Management Manual (SMM)

Appendix B Catalogue of existing administrative procedures and technical requirements

Appendix B.1 EASA Internal Certification Working Procedures

B1.1.1	Name of document:	DECISION No 2005/01/CF OF THE EXECUTIVE DIRECTOR OF THE AGENCY of 25 January 2005 establishing the Agency's Internal Certification Working Procedures
	Authority that issued the document:	THE EXECUTIVE DIRECTOR OF THE EUROPEAN AVIATION SAFETY AGENCY
	Date and place of publication:	Cologne, on 25/01/2005
	Date of entry into force:	This Decision entered into force on 25 January 2005.
	Scope of regulation /standard:	Has established the following Internal Certification Working Procedures: Type Certification; ETSO-Authorisation; Design Organisation Approval; Alternative Procedures to Design Organisation Approval; Production Organisation Approval; Maintenance Organisation Approval; Maintenance Training Organisation Approval.
B1.1.2	Name of document:	EASA Procedure, Doc # E.P010-01 - Certification Support for Validation (CSV)
	Authority that issued the document:	European Aviation Safety Agency
	Date and place of publication:	Cologne, 19/09/2008
	Date of entry into force:	This Decision entered into force on 23/10/2007
	Scope of regulation /standard:	This internal working procedure defines the process for the certification support for holders and Applicants of EASA approvals of products, parts and appliances requesting a validation of their approvals in a third country. Furthermore, the need for test witnessing, conformity inspections and/or other compliance finding support may occur in relation to a third country certification or approval effort involving EU suppliers (including Iceland, Liechtenstein, Norway and Switzerland), where the third country acts as the PCA and no EASA certificate is required (e.g. when under a subcontract of a TC-holder a part of an aircraft designed in a third country is developed, built and/or tested in one of the EU Member States, Iceland, Liechtenstein, Norway and Switzerland). This internal working procedure describes how EASA will provide services to Applicants in relation to the above mentioned activities. The scope of this procedure is limited to those cases where the need for EASA providing these services is established, either by bilateral agreements or working arrangements, or on request of the Applicant and/or authority of the third country involved.
B1.1.3	Name of document:	EASA Procedure, Doc PR.TC.00001-002- Type certification

	Authority that issued the document:	European Aviation Safety Agency
	Date and place of publication:	Cologne, 17/09/2010
	Date of entry into force:	This Decision entered into force on 09/07/2010
	Scope of regulation /standard:	This document describes how the Certification Directorate of the European Aviation Safety Agency will internally handle type certification of aeronautical products and related tasks. This procedure shall be followed in order to achieve standardised processes within the Agency. This procedure describes all technical aspects related to the type certification of aeronautical products; it excludes the purely administrative aspects as processing the applications and determination of fees. This procedure applies to the type certification of EU aeronautical products and to changes thereto, in accordance with Annex Part 21 to Commission Regulation (EC) No. 1702/2003. This procedure also includes the performance of type certification of non-EU products and describes how EASA will handle the suspension or revocation of certificates according to Annex Part 21 to Commission Regulation (EC) No. 1702/2003.
B1.1.4	Name of document:	EASA Procedure, Doc PR.STC.00001-002- Supplemental type certification
	Authority that issued the document:	European Aviation Safety Agency
	Date and place of publication:	Cologne, 17/09/2010
	Date of entry into force:	This Decision entered into force on 09/07/2010
	Scope of regulation /standard:	This procedure describes the process how the Certification Directorate of the European Aviation Safety Agency handles the supplemental type certification of aeronautical products and how it will issue Supplemental Type Certificates (STC). This procedure shall be followed in order to achieve standardised processes within the Agency. This procedure describes all technical aspects related to the supplemental type certification of aeronautical products; it does not include the purely administrative aspects as processing the applications and determination of fees. An STC attests the approval of a major change, classified in accordance with Article 21A.91 of Annex Part 21 to Commission Regulation (EC) No. 1702/2003, to an approved type design where the designer of the major change is not the Type Certificate holder. The supplemental type certification shall be performed in accordance with the provisions of Annex I of the Basic Regulation and Annex Part 21, Subpart E of Commission Regulation (EC) No. 1702/2003 of 24 September 2003 laying down implementing rules for the airworthiness and environmental certification of aircraft and related products, parts and appliances and the related Acceptable Means of Compliance (“AMC”) and Guidance Material (“GM”).

	Scope of regulation /standard:	This procedure also includes the performance of supplemental type certification of major changes designed by non-EU organisations and describes how EASA will handle the suspension, limitation or revocation of STCs according to Annex Part 21 to Commission Regulation (EC) No. 1702/2003.
B1.1.5	Name of document:	EASA Procedure, Doc PR.TCCH.00001-001- Approval of change to type certificate
	Authority that issued the document:	European Aviation Safety Agency
	Date and place of publication:	Cologne, 17/09/2010
	Date of entry into force:	This Decision entered into force on 21/07/2010
	Scope of regulation /standard:	This procedure defines the Type Certificate major change approval process as well as the approval process for minor changes and Flight Manual (FM) stand alone changes. This procedure applies to Type Certificate Major change and FM change approvals when the applicant is the Type Certificate (TC) holder. It also applies to Type Certificate Minor change approvals when the applicant is not the TC holder. In accordance with Article 21A.117(a) of Annex Part 21 to Commission Regulation (EC) No 1702/2003, this procedure is also applicable for approval of minor changes to the part of a product covered by a Supplemental Type Certificate. This procedure also includes the approval of major changes designed by non-EU organisations in accordance with Annex Part 21 to Commission Regulation (EC) No 1702/2003. Further guidance is described in the Certification general user guide (former Certification Handbook), document UG.TC.00002. In accordance with Articles 21A.117(b) & (c) this procedure does not apply for approval of major changes to the part of a product covered by an STC and applied for by the STC holder itself or by an applicant who is not the STC holder. Further, this procedure does not apply to Restricted Type Certificates and ETSO authorisations.
B1.1.6	Name of document:	EASA Procedure, Doc PR.TCCH.00002-001- Approval of repair design
	Authority that issued the document:	European Aviation Safety Agency
	Date and place of publication:	Cologne, 17/09/2010
	Date of entry into force:	This Decision entered into force on 21/07/2010
	Scope of regulation /standard:	This procedure defines the process for the approval of repair design. This procedure applies to all repair approvals designed by EU and non-EU organisations. Further guidance is described in the Certification general user guide (former Certification Handbook), document UG.TC.00002.
B1.1.7	Name of document:	EASA Procedure, Doc PR.ETSOA.00001-001- European Technical Standard Order Authorisation

	Authority that issued the document:	European Aviation Safety Agency
	Date and place of publication:	Cologne, 17/09/2010
	Date of entry into force:	This Decision entered into force on 21/07/2010
	Scope of regulation /standard:	This document describes how EASA will internally handle European Technical Standard Order Authorisation (ETSOA) approvals and related tasks. This procedure shall be followed in order to achieve standardised processes within the Agency. This procedure applies to ETSO-Authorisations, changes thereto and approvals of deviation from any performance standard of an ETSO in accordance with Subpart O of Annex Part 21 to Commission Regulation (EC) No. 1702/2003. This procedure also includes the performance of ETSO-Authorisations of non-EU products and describes how EASA will handle the suspension or revocation of certificates according to Annex Part 21 of Commission Regulation (EC) No. 1702/2003.
B1.1.8	Name of document:	EASA Procedure, Doc PR.AFC.00001-001- Approval of flight conditions for a permit to fly
	Authority that issued the document:	European Aviation Safety Agency
	Date and place of publication:	Cologne, 17/09/2010
	Date of entry into force:	This Decision entered into force on 13/09/2010
	Scope of regulation /standard:	This document describes how the European Aviation Safety Agency internally handles the technical tasks related to the approval of flight conditions related to safety of design on which the competent authority of the EU Member State of Registry bases its Permit to Fly. This procedure shall be followed in order to achieve standardised processes within the Agency. The scope of this procedure is limited to the approval of flight conditions relative to aircraft that do not meet, or have not been shown to meet, applicable airworthiness requirements but are capable of safe flight under defined conditions and for the following purposes: * development * showing compliance with regulations or certification specifications * flying the aircraft for Authority acceptance * market survey, including customer's crew training * exhibition and air show * flying the aircraft to a location where maintenance or airworthiness review are to be performed, or to a place of storage * flying an aircraft at a weight in excess of its maximum certificated takeoff weight for flight beyond the normal range over water, or over land areas where adequate landing facilities or appropriate fuel is not available * record breaking, air racing or similar competition * for non-commercial flying activity on individual non-complex aircraft or types for which a Certificate of Airworthiness or restricted Certificate of Airworthiness is not appropriate

B1.1.9	Name of document:	EASA Procedure, Doc PR.SLC.00001-001- Limitation, suspension and revocation of product certificate
	Authority that issued the document:	European Aviation Safety Agency
	Date and place of publication:	Cologne, 17/09/2010
	Date of entry into force:	This Decision entered into force on 20/07/2010
	Scope of regulation /standard:	This procedure describes how the Agency will internally handle limitations to, suspension and revocation of product certificates and related tasks. The procedure shall be followed in order to achieve standardised processes within the Agency. This procedure describes all technical aspects related to the limitation, suspension or revocation of product certificates according to Annex Part 21 to Commission Regulation (EC) No. 1702/2003. This procedure applies to EU and non-EU aeronautical products
B1.1.10	Name of document:	EASA Procedure, Doc PR.TOC.00001-001- Transfer or surrender of a product certificate
	Authority that issued the document:	European Aviation Safety Agency
	Date and place of publication:	Cologne, 17/09/2010
	Date of entry into force:	This Decision entered into force on 13/09/2010
	Scope of regulation /standard:	This procedure describes how to transfer a product certificate to a new certificate holder and how to surrender a product certificate. This procedure applies to the transfer of a (Restricted) Type Certificate ((R)TC) and a Supplemental Type Certificate (STC) and to the surrender of a (Restricted) Type Certificate ((R)TC), a Supplemental Type Certificate (STC) and an European Technical Standard Order Authorisation (ETSOA) in accordance with the applicable provisions of Annex Part 21 to Commission Regulation (EC) No 1702/2003. It does not include change of ownership for an ETSO authorisation. This procedure shall be followed in order to achieve standardised processes within the Agency
B1.1.11	Name of document:	EASA Procedure, PR.TAC.00001-001- Provide technical advice
	Authority that issued the document:	European Aviation Safety Agency
	Date and place of publication:	Cologne, 17/09/2010
	Date of entry into force:	This Decision entered into force on 21/07/2010

	Scope of regulation /standard:	The industry occasionally requests the Agency to provide "pre-application services", i.e. technical advice services before the actual application process has started. The reason for these requests is generally that the client intends to use new or novel technologies in its design of aeronautical products and consequently seeks the Agency's preliminary view about using such technology. The purpose of this procedure is to lay down general principles related to the provision of technical advice, under a new or amended Technical Advice Contract to the clients. It also stresses important issues the Certification Directorate staff has to consider when involved in the provision of Technical Advice Contracts.
B1.1.12	Name of document:	EASA Procedure, Doc PO.CAP.00016-001- Airworthiness Directive Policy
	Authority that issued the document:	European Aviation Safety Agency
	Date and place of publication:	Cologne, 17/09/2010
	Date of entry into force:	This Decision entered into force on 13/09/2010
	Scope of regulation /standard:	The distribution of responsibilities between the European Aviation Safety Agency and Member States as specified by Regulation (EC) No. 216/2008 has triggered many discussions on the issuing of airworthiness directives. It is feared in particular that a too narrow interpretation of Agency's responsibilities towards continuing airworthiness creates loopholes and therefore safety gaps. This policy recalls the applicable legal framework under Regulation (EC) No. 216/2008 and Annex 8 to the Convention on International Civil Aviation and provides the newly established Agency policy within those legal boundaries.
B1.1.13	Name of document:	EASA Procedure, Doc PR.CAP.00001-002- Continuing airworthiness of type design (CAP)
	Authority that issued the document:	European Aviation Safety Agency
	Date and place of publication:	Cologne, 25/04/2012
	Date of entry into force:	This Decision entered into force on 23/04/2012
	Scope of regulation /standard:	This procedure describes how the European Aviation Safety Agency (hereinafter referred to as "the Agency") shall internally handle the continuing airworthiness functions related to type design pursuant to Article 20(1)(j) of Regulation (EC) No. 216/2008 ("Basic Regulation"). It has been defined to implement Article 15 of Decision No 12/2007 of 01 October 2007 of the Management Board concerning the general principles related to the certification procedures to be applied by the Agency for the issuing of certificates for products, parts and appliances ("PCP Decision"), mandating the Executive Director to "establish the necessary associated detailed procedures for the implementation of this Decision […]".

	Scope of regulation /standard:	This procedure shall be followed in order to achieve standardized processes within the Agency. This procedure applies to the continuing airworthiness functions related to the type design of aeronautical products, parts and appliances under the Agency´s scope of competences pursuant to the Basic Regulation.
B1.1.14	Name of document:	EASA Procedure, Doc PR.CAP.00008-001- Alternative Method of Compliance (AMOC) with Airworthiness Directive (AD)
	Authority that issued the document:	European Aviation Safety Agency
	Date and place of publication:	Cologne, 17/09/2010
	Date of entry into force:	This Decision entered into force on 10/09/2010
	Scope of regulation /standard:	This document describes how the Certification Directorate of the European Aviation Safety Agency (EASA) internally handles Applications for Approval of Alternative Methods of Compliance (AMOC) with Airworthiness Directives (AD) and related tasks. This procedure shall be followed in order to achieve standardised processes within the Agency. This procedure describes all technical aspects related to the approval of AMOCs with ADs; it excludes the purely administrative aspects as processing the applications from an administrative point of view and determination of fees. This procedure also includes the approval of AMOCs with foreign ADs.
B1.1.15	Name of document:	EASA Procedure, Doc PR.CAP.00007-001- Safety Information Bulletin (SIB)
	Authority that issued the document:	European Aviation Safety Agency
	Date and place of publication:	Cologne, 17/09/2010
	Date of entry into force:	This Decision entered into force on 10/09/2010
	Scope of regulation /standard:	This document describes how the Certification Directorate of the European Aviation Safety Agency (EASA) internally handles Safety Information Bulletins and related tasks. This procedure shall be followed in order to achieve standardised processes within the Agency. This procedure describes all technical aspects related to the issuance of Safety Information Bulletins and adoption of Foreign Safety Advisory Information (FSAI).
B1.1.16	Name of document:	EASA Procedure, Doc PR.MRB.00001-001- Maintenance Review Board
	Authority that issued the document:	European Aviation Safety Agency
	Date and place of publication:	Cologne, 17/09/2010
	Date of entry into force:	This Decision entered into force on 16/06/2010

	Scope of regulation /standard:	This procedure describes how EASA will internally handle applications for acceptance of Maintenance Review Board Reports (MRBR) or Supplements to MRBR, Manufacturer Recommended Maintenance Programmes (MRMP), revisions thereto and related tasks. This procedure shall be followed in order to achieve standardised processes within the Agency. The "MRB process" consists of all the activities performed to produce, review, accept and amend the Maintenance Review Board Report (MRBR), Supplement to MRBR, Manufacturer Recommended Maintenance Programme (MRMP). This procedure applies to the processing of applications to obtain approval of a MRBR, Supplement to MRBR, MRMP or revisions thereto. This procedure is complemented by the EASA work instruction on Maintenance Review Board Team WI.MRB.00002.
B1.1.17	Name of document:	EASA Procedure, Doc WI.MRB.00002-001- Maintenance Review Board team
	Authority that issued the document:	European Aviation Safety Agency
	Date and place of publication:	Cologne, 17/09/2010
	Date of entry into force:	This Decision entered into force on 15/06/2010
	Scope of regulation /standard:	This procedure explains the work done by the team in order to provide assistance to the Applicant when providing compliance to Certification Specification, CS XX.1529, through the MRB process.

Appendix B.2 Initial airworthiness and continuing airworthiness

Airworthiness and Environmental Certification

B2.1.1	Name of document:	DECISION 2013/001/R OF THE EXECUTIVE DIRECTOR OF THE AGENCY of 23 January 2013 on Acceptable Means of Compliance and Guidance Material for the airworthiness and environmental certification of aircraft and related products, parts and appliances, as well as for the certification of design and production organisations ('AMC and GM to Part-21') amending ED DECISION 2012/020/R OF THE EXECUTIVE DIRECTOR OF THE AGENCY OF 30 October 2012 'AMC & GM to Part-21 Amendment 1 to Issue 2' 'Implementation of CAEP/8'
	Authority that issued the document:	THE EXECUTIVE DIRECTOR OF THE EUROPEAN AVIATION SAFETY AGENCY
	Date and place of publication:	Cologne, on 23/01/2013
	Date of entry into force:	This Decision entered into force on 29 January 2013.
	Scope of regulation /standard:	The Annex I 'Acceptable Means of Compliance and Guidance Material to be used in the airworthiness certification of products, parts and appliances and the approval of organisations involved in their design or manufacture' to ED Decision 2012/020/R of the Executive Director of the Agency of 30 October 2012 is hereby amended in accordance to the annex to this Decision.
	Documents issued under that legislation:	Annex to ED Decision 2013/001/R
B2.1.2	Name of document:	DECISION N° 2012/020/R OF THE EXECUTIVE DIRECTOR OF THE AGENCY of 30th October 2012 on Acceptable Means of Compliance and Guidance Material for the airworthiness and environmental certification of aircraft and related products, parts and appliances, as well as for the certification of design and production organisations ('AMC and GM to Part 21') repealing DECISION NO 2003/01/RM OF THE EXECUTIVE DIRECTOR OF THE AGENCY OF 17 October 2003
	Authority that issued the document:	THE EXECUTIVE DIRECTOR OF THE EUROPEAN AVIATION SAFETY AGENCY
	Date and place of publication:	Cologne, 30th October 2012
	Date of entry into force:	This Decision entered into force on 6th November 2012
	Scope of regulation /standard:	The Acceptable Means of Compliance and Guidance Material to be used in the airworthiness certification of products, parts and appliances and the approval of organisations involved in their design or manufacture are those laid down in the Annex I to this Decision, unless otherwise provided in the Certification Specifications.

	Documents issued under that legislation:	Annex I to ED Decision 2012/020/R: AMC and GM to Part 21 - Acceptable Means of Compliance and Guidance Material for the airworthiness and environmental certification of aircraft and related products, parts and appliances, as well as for the certification of design and production organisations; Issue 2; 30 October 2012
	Note:	Decision No 2003/01/RM of the Executive Director of the Agency of 17 October 2003 on Acceptable Means of Compliance and Guidance Material for the airworthiness and environmental certification of aircraft and related products, parts and appliances, as well as for the certification of design and production organisations ('AMC and GM to Part 21') is hereby repealed

Certification Specifications

B2.2.1	Name of document:	DECISION NO. 2003/12/RM OF THE EXECUTIVE DIRECTOR OF THE AGENCY of 5 November 2003 on general acceptable means of compliance for airworthiness of products, parts and appliances ("AMC-20"). This Decision was amended following Decisions: No 2012/014/R of 17 September 2012 No 2011/001/R of 23 March 2011 No 2010/012/R of 16 December 2010 No 2010/003/R of 19 July 2010 No 2009/019/R of 16 December 2009 No 2008/007/R of 29 August 2008 No 2008/004/R of 25 April 2008 No 2007/019/R of 19 December 2007 No 2006/12/R of 22 December 2006
	Authority that issued the document:	THE EXECUTIVE DIRECTOR OF THE AGENCY
	Date and place of publication:	Brussels, 05 November 2003
	Date of entry into force:	This Decision was entered into force on 05 November 2003.
	Scope of regulation /standard:	The general acceptable means of compliance for airworthiness of products, parts and appliances are those laid down in the Annex to this Decision.
	Documents issued under that legislation:	Annex: AMC-20/ Initial issue (05/11/2003) – General Acceptable Means of Compliance for Airworthiness of Products, Parts and Appliances. [AMC 20-115B - Recognition of EUROCAE ED-12B / RTCA DO-178B; AMC 20–128A - Design Considerations for Minimizing Hazards Caused by Uncontained Turbine Engine and Auxiliary Power Unit Rotor Failure; AMC 20-1 - Certification of Aircraft Propulsion Systems Equipped with Electronic Controls; AMC 20-2 - Certification of Essential APU Equipped with Electronic Controls; AMC 20-4 - Airworthiness Approval and Operational Criteria For the Use of Navigation Systems in European Airspace Designated For Basic RNAV Operations; AMC 20-5 - Airworthiness Approval and Operational Criteria for the use of the NAVSTAR Global Positioning System (GPS); AMC 20-6 - Extended Range Operation with Two-Engine Aeroplanes ETOPS Certification and Operation;

		AMC 20-8 - Occurrence Reporting] AMC-20 Current Issue: (AMC-20 has not been published as consolidated version) AMC-20/9 (24/09/2012) – ED Decision 2012/014/R [AMC 20-28 - Airworthiness Approval and Operational Criteria related to Area Navigation for Global Navigation Satellite System approach operation to Localiser Performance with Vertical guidance minima using Satellite Based Augmentation System] AMC-20/8 (30/03/2011) – ED Decision 2011/001/R [AMC 20-15: - Airworthiness Certification Considerations for the Airborne Collision Avoidance System (ACAS II) with optional Hybrid Surveillance] AMC-20/7 (23/12/2010) – ED Decision 2010/012/R [AMC 20-6 rev. 2 - Extended Range Operation with Two-Engine Aeroplanes ETOPS Certification and Operation] AMC-20/6 (26/07/2010) – ED Decision 2010/003/R [AMC 20-29 - Composite Aircraft Structure] AMC-20/5 (23/12/2009) – ED Decision 2009/019/R [AMC 20-26 - Airworthiness Approval and Operational Criteria for RNP Authorisation Required (RNP AR) Operations; AMC 20-27 - Airworthiness Approval and Operational Criteria for RNP APPROACH (RNP APCH) Operations Including APV BAROVNAV Operations] AMC-20/4 (05/09/2008) – ED Decision 2008/007/R [AMC 20-21 - Programme to enhance aeroplane Electrical Wiring Interconnection System (EWIS) maintenance; AMC 20-22 - Aeroplane Electrical Wiring Interconnection System Training Programme; AMC 20-23 - Development of Electrical Standard Wiring Practices documentation] AMC-20/3 (02/05/2008) – ED Decision 2008/004/R [AMC 20-24 - Certification Considerations for the Enhanced ATS in Non-Radar Areas using ADS-B Surveillance (ADS-B-NRA) Application via 1090 MHZ Extended Squitter.] AMC-20/2 (26/12/2007) – ED Decision 2007/019/R [AMC 20-1 - Certification of Aircraft Propulsion Systems Equipped with Electronic Control Systems (Amended); AMC 20-3 - Certification of Engines Equipped with Electronic Engine Control Systems; AMC 20-11 - Acceptable Means of Compliance for the Approval of use of Initial Services for Air-Ground Data Link in Continental Airspace; AMC 20-20 - Continuing Structural Integrity Programme] AMC-20/1 (29/12/2006) – ED Decision 2006/12/R [AMC 20-9 - Acceptable Means of Compliance for the Approval of Departure Clearance via Data Communications over ACARS; AMC 20-10 - Acceptable Means of Compliance for the Approval of Digital ATIS via Data Link over ACARS;

		AMC 20-12 - Recognition Of FAA Order 8400.12a For RNP-10 Operations; AMC 20-13 - Certification of Mode S Transponder Systems for Enhanced Surveillance]

Continuing Airworthiness

B2.3.1	Name of document:	DECISION NO 2012/004/R OF THE EXECUTIVE DIRECTOR OF THE AGENCY of 19 April 2012 amending the Annexes I, II, IV, V, VI, VII and VIII to Decision No 2003/19/RM of the Executive Director of the European Aviation Safety Agency of 28 November 2003 on acceptable means of compliance and guidance material to Commission Regulation (EC) No 2042/2003 of 20 November 2003 on the continuing airworthiness of aircraft and aeronautical products, parts and appliances, and on the approval of organisations and personnel involved in these tasks.
	Authority that issued the document:	THE EXECUTIVE DIRECTOR OF THE EUROPEAN AVIATION SAFETY AGENCY
	Date and place of publication:	Cologne, 19 April 2012
	Date of entry into force:	This Decision was entered into force on 01 August 2012.
	Scope of regulation /standard:	The Annex VIII (GM to Part-M) to ED Decision 2003/19/RM of the Executive Director of the European Aviation Safety Agency of 28 November 2003 on acceptable means of compliance and guidance material to Commission Regulation (EC) No 2042/2003 of 20 November 2003 on the continuing airworthiness of aircraft and aeronautical products, parts and appliances, and on the approval of organisations and personnel involved in these tasks are hereby amended as provided in the Annex to this Decision.
	Documents issued under that legislation:	Annex VIII Guidance Material to Part-M/Amendment 2
B2.3.2	Name of document:	DECISION No 2010/002/R OF THE EXECUTIVE DIRECTOR OF THE AGENCY OF 28 APRIL 2010 amending the Annexes to Decision No 2003/19/RM of the Executive Director of the Agency of 28 November 2003 on acceptable means of compliance and guidance material to Commission Regulation (EC) No 2042/2003 of 20 November 2003 on the continuing airworthiness of aircraft and aeronautical products, parts and appliances, and on the approval of organisations and personnel involved in these tasks.
	Authority that issued the document:	THE EXECUTIVE DIRECTOR OF THE AGENCY
	Date and place of publication:	Cologne, 28 April 2010
	Date of entry into force:	This Decision entered into force on 05 May 2010.

	Scope of regulation /standard:	(1) The Annexes I, II, III, VI, V, VI and VII to Decision 2003/19/RM of the Executive Director of the Agency of 28 November 2003 on acceptable means of compliance and guidance material to Commission Regulation (EC) No 2042/2003 of 20 November 2003 on the continuing airworthiness of aircraft and aeronautical products, parts and appliances, and on the approval of organisations and personnel involved in these tasks are hereby amended as provided in the Annex to this decision. (2) New Annex VIII (GM to Part-M) is added.
	Documents issued under that legislation:	Annex to Decision 2010/002/R:
B2.3.3	Name of document:	DECISION NO. 2003/19/RM OF THE EXECUTIVE DIRECTOR OF THE AGENCY of 28 November 2003 on acceptable means of compliance and guidance material to Commission Regulation (EC) No 2042/2003 of 20 November 2003 on the continuing airworthiness of aircraft and aeronautical products, parts and appliances, and on the approval of organisations and personnel involved in these tasks. This Decision was amended by the following Decisions: No 2012/004/R of 19 April 2012 No 2010/006/R of 31 August 2010 No 2010/002/R of 28 April 2010 No 2009/006/R of 24 March 2009 No 2008/013/R of 12 December 2008 No 2007/001/R of 13 March 2007 No 2006/14/R of 20 December 2006 No 2006/11/R of 18 December 2006
	Authority that issued the document:	THE EXECUTIVE DIRECTOR OF THE AGENCY
	Date and place of publication:	Brussels, 28 November 2003
	Date of entry into force:	This Decision was entered into force on the day following its publication in the Official Publication of the Agency (29/11/2003).
	Scope of regulation /standard:	The acceptable means of compliance and guidance material to be used for the continuing airworthiness of aircraft and aeronautical products, parts and appliances, and for the approval of organisations and personnel involved in these tasks in accordance with Commission Regulation (EC) No 2042/2003 are those laid down in the Annex to this Decision.
	Documents issued under that legislation:	Annex I: Acceptable Means of Compliance to Part-M/0 (Initial Issue). AMC to Part-M Current Issue: (AMC to Part-M has not been published as consolidated version) AMC-Part-M/8 (19/04/2012) – ED Decision 2012/004/R AMC-Part-M/7 (07/09/2010) – ED Decision 2010/006/R AMC-Part-M/6 (05/05/2010) – ED Decision 2010/002/R AMC-Part-M/5 (31/03/2009) – ED Decision 2009/006/R AMC-Part-M/4 (19/12/2008) – ED Decision 2008/013/R AMC-Part-M/3 (20/03/2007) – ED Decision 2007/001/R AMC-Part-M/2 (27/12/2006) – ED Decision 2006/14/R AMC-Part-M/1 (25/12/2006) – ED Decision 2006/11/R

Appendix B.3 Air Crew

B3.1	Name of document:	DECISION No 2011/016/R OF THE EXECUTIVE DIRECTOR OF THE AGENCY OF 15 DECEMBER 2011 on Acceptable Means of Compliance and Guidance Material to Commission Regulation (EU) No 1178/2011 of 3 November 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.
	Authority that issued the document:	THE EXECUTIVE DIRECTOR OF THE AGENCY
	Date and place of publication:	Cologne, 15 December 2011
	Date of entry into force:	This Decision was entered into force on 22 December 2011.
	Scope of regulation /standard:	The "Acceptable Means of Compliance and Guidance Material to Part-FCL" are those laid down in the Annex to this Decision.
	Documents issued under that legislation:	Annex: Acceptable Means of Compliance and Guidance Material to Part-FCL / Initial issue.
B3.2	Name of document:	DECISION No 2011/015/R OF THE EXECUTIVE DIRECTOR OF THE AGENCY OF 15 DECEMBER 2011 on Acceptable Means of Compliance and Guidance Material to Commission Regulation (EU) No 1178/2011 of 3 November 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.
	Authority that issued the document:	THE EXECUTIVE DIRECTOR OF THE AGENCY
	Date and place of publication:	Cologne, 15 December 2011
	Date of entry into force:	This Decision was entered into force on 22 December 2011.
	Scope of regulation /standard:	The Acceptable Means of Compliance and Guidance Material to Part-MED are those laid down in the Annex to this Decision.
	Documents issued under that legislation:	Annex: Acceptable Means of Compliance and Guidance Material to Part-MED / Initial issue.
B3.3	Name of document:	DECISION No 2012/005/DIRECTORATE R OF THE EXECUTIVE DIRECTOR OF THE AGENCY OF 19TH April 2012 on Guidance Material to Commission Regulation (EU) No 1178/2011 of 3 November 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.
	Authority that issued the document:	THE EXECUTIVE DIRECTOR OF THE AGENCY
	Date and place of publication:	Cologne, 19 April 2012

	Date of entry into force:	This Decision entered into force on 20 April 2012.
	Scope of regulation /standard:	The “Guidance Material to Part-CC” is that laid down in the Annex to this Decision.
	Documents issued under that legislation:	Annex: “Guidance Material (GM) to Part-CC” / Initial issue.
B3.4	Name of document:	DECISION No 2012/006/DIRECTORATE R OF THE EXECUTIVE DIRECTOR OF THE AGENCY OF 19TH APRIL 2012 on Acceptable Means of Compliance and Guidance Material to Commission Regulation (EU) No 1178/2011 of 3 November 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.
	Authority that issued the document:	THE EXECUTIVE DIRECTOR OF THE AGENCY
	Date and place of publication:	Cologne, 19 April 2012
	Date of entry into force:	This Decision was entered into force on 20 April 2012.
	Scope of regulation /standard:	The “Acceptable Means of Compliance and Guidance Material to Part-ARA” are those laid down in the Annex to this Decision.
	Documents issued under that legislation:	Annex: “Acceptable Means of Compliance and Guidance Material to Part-ARA” / Initial issue.
B3.5	Name of document:	DECISION No 2012/007/DIRECTORATE R OF THE EXECUTIVE DIRECTOR OF THE AGENCY OF 19TH APRIL 2012 on Acceptable Means of Compliance and Guidance Material to Commission Regulation (EU) No 1178/2011 of 3 November 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.
	Authority that issued the document:	THE EXECUTIVE DIRECTOR OF THE AGENCY
	Date and place of publication:	Cologne, 19 April 2012
	Date of entry into force:	This Decision was entered into force on 20 April 2012.
	Scope of regulation /standard:	The “Acceptable Means of Compliance and Guidance Material to Part-ORA” are those laid down in the Annex to this Decision.
	Documents issued under that legislation:	Annex: “Acceptable Means of Compliance and Guidance Material to Part-ORA’” / Initial issue.

Appendix B.4 Air Operations

B4.1	Name of document:	DECISION No 2012/015/DIRECTORATE R OF THE EXECUTIVE DIRECTOR OF THE AGENCY OF 24TH OCTOBER 2012 on Acceptable Means of Compliance and Guidance Material to Commission Regulation (EU) No 965/2012 of 5 October 2012 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 Guidance Material to Annex I – Definitions.
	Authority that issued the document:	THE EXECUTIVE DIRECTOR OF THE AGENCY
	Date and place of publication:	Cologne, 24 October 2012
	Date of entry into force:	This Decision was entered into force on 25 October 2012.
	Scope of regulation /standard:	The Decision No 2012/015/R of the Executive Director of the European Aviation Safety Agency of 24th October 2012 on acceptable means of compliance and guidance material to Commission Regulation (EU) No 965/2012 of 5 October 2012 is hereby adopted as provided in the Annex to this Decision.
	Documents issued under that legislation:	Annex: Guidance Material to Annex I - Definition for terms used in Annexes II-V / Initial issue.
B4.2	Name of document:	DECISION No 2012/016/DIRECTORATE R OF THE EXECUTIVE DIRECTOR OF THE AGENCY OF 24TH OCTOBER 2012 on Acceptable Means of Compliance and Guidance Material to Commission Regulation (EU) No 965/2012 of 5 October 2012 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
	Authority that issued the document:	THE EXECUTIVE DIRECTOR OF THE AGENCY
	Date and place of publication:	Cologne, 24 October 2012
	Date of entry into force:	This Decision was entered into force on 25 October 2012.
	Scope of regulation /standard:	The Decision No 2012/016/R of the Executive Director of the European Aviation Safety Agency of 24th October 2012 on acceptable means of compliance and guidance material to Commission Regulation (EU) No 965/2012 of 5 October 2012 is hereby adopted as provided in the Annex to this Decision.
	Documents issued under that legislation:	Annex: AMC and GM to Annex II “Part-ARO” / Initial issue.

B4.3	Name of document:	DECISION No 2012/017/DIRECTORATE R OF THE EXECUTIVE DIRECTOR OF THE AGENCY OF 24TH OCTOBER 2012 on Acceptable Means of Compliance and Guidance Material to Commission Regulation (EU) No 965/2012 OF 5 October 2012 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.
	Authority that issued the document:	THE EXECUTIVE DIRECTOR OF THE AGENCY
	Date and place of publication:	Cologne, 24 October 2012
	Date of entry into force:	This Decision was entered into force on 25 October 2012.
	Scope of regulation /standard:	The Decision No 2012/017/R of the Executive Director of the European Aviation Safety Agency of 24th October 2012 on acceptable means of compliance and guidance material to Commission Regulation (EU) No 965/2012 of 5 October 2012 is hereby adopted as provided in the Annex to this Decision.
	Documents issued under that legislation:	Annex: Annex: AMC and GM to Annex III “Part-ORO” / Initial issue.
B4.4	Name of document:	DECISION No 2012/018/DIRECTORATE R OF THE EXECUTIVE DIRECTOR OF THE AGENCY OF 24TH OCTOBER 2012 on Acceptable Means of Compliance and Guidance Material to Commission Regulation (EU) No 965/2012 of 5 October 2012 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.
	Authority that issued the document:	THE EXECUTIVE DIRECTOR OF THE AGENCY
	Date and place of publication:	Cologne, 24 October 2012
	Date of entry into force:	This Decision was entered into force on 25 October 2012.
	Scope of regulation /standard:	The Decision No 2012/018/R of the Executive Director of the European Aviation Safety Agency of 24th October 2012 on acceptable means of compliance and guidance material to Commission Regulation (EU) No 965/2012 of 5 October 2012 is hereby adopted as provided in the Annex to this Decision.
	Documents issued under that legislation:	Annex: Annex: AMC and GM to Annex IV “Part-CAT” / Initial issue.
B4.5	Name of document:	DECISION No 2012/019/DIRECTORATE R OF THE EXECUTIVE DIRECTOR OF THE AGENCY OF 24TH OCTOBER 2012 on Acceptable Means of Compliance and Guidance Material to Commission Regulation (EU) No 965/2012 OF 5 October 2012 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.

	Authority that issued the document:	THE EXECUTIVE DIRECTOR OF THE AGENCY
	Date and place of publication:	Cologne, 24 October 2012
	Date of entry into force:	This Decision was entered into force on 25 October 2012.
	Scope of regulation /standard:	The Decision No 2012/019/R of the Executive Director of the European Aviation Safety Agency of 24th October 2012 on acceptable means of compliance and guidance material to Commission Regulation (EU) No 965/2012 of 5 October 2012 is hereby adopted as provided in the Annex to this Decision.
	Documents issued under that legislation:	Annex: Acceptable Means of Compliance (AMC) and Guidance Material (GM) to Part-SPA / Initial issue.
B4.6	Name of document:	COMMENT RESPONSE DOCUMENT (CRD) TO NOTICE OF PROPOSED AMENDMENT (NPA) 2011-05 for (…) a DRAFT OPINION OF THE EUROPEAN AVIATION SAFETY AGENCY for a Commission Regulation establishing the Implementing Rules on the Agency for the authorisation of Third Country Operators.
	Authority that issued the document:	THE EXECUTIVE DIRECTOR OF THE AGENCY
	Date and place of publication:	26 January 2012
	Date of entry into force:	n/a
	Scope of regulation /standard:	Draft Decision AMC and GM for Part Third Country Operators requirements (Part-TCO).
	Documents issued under that legislation:	Draft: AMC and GM to Annex II “Part-TCO”

Appendix B.5 ATM/ANS

B5.1	Name of document:	DECISION No 2012/002/R OF THE EXECUTIVE DIRECTOR OF THE AGENCY of 8th March 2012 on the Acceptable Means of Compliance and Guidance Material for common airspace usage Requirements and Operating Procedures.
	Authority that issued the document:	THE EXECUTIVE DIRECTOR OF THE AGENCY
	Date and place of publication:	Cologne, 8 March 2012
	Date of entry into force:	This Decision was entered into force on 15 March 2012.
	Scope of regulation /standard:	The Acceptable Means of Compliance and Guidance Material to be used in compliance with the airspace usage requirements and operating procedures are those laid down in the Annex to this Decision.
	Documents issued under that legislation:	Annex: AMC and GM for common airspace usage requirements and operating procedures (AUR) / Initial issue (08/03/2012).

Appendix B.6 Safety Key Performance Indicators (SKPIs)

B6.1	Name of document:	DECISION NO 2011/017/R OF THE EXECUTIVE DIRECTOR OF THE EUROPEAN AVIATION SAFETY AGENCY OF 16TH DECEMBER 2011 on acceptable means of compliance and guidance material to Section 2 of Annex I to Commission Regulation (EU) No 691/2010 laying down a performance scheme for air navigation services and network functions as amended by Commission Implementing Regulation (EU) No 1216/2011 'Acceptable Means of Compliance and Guidance Material for the implementation and measurement of safety KPIs (ATM performance IR)'
	Authority that issued the document:	THE EXECUTIVE DIRECTOR OF THE EUROPEAN AVIATION SAFETY AGENCY
	Date and place of publication:	Cologne, on 16th December 2011.
	Date of entry into force:	This Decision was entered into force on 23rd December 2011.
	Scope of regulation /standard:	Acceptable Means of Compliance and Guidance Material for the implementation and measurement of safety KPIs pursuant to the performance scheme Regulation are established in the Annex to this Decision.
	Documents issued under that legislation:	Annex: Acceptable Means of Compliance and Guidance Material for the implementation and measurement of Safety Key Performance Indicators (SKPIs) (ATM performance IR)

Appendix B.7 Organization Approvals

B7.1	Name of document:	DECISION NO. 2003/19/RM OF THE EXECUTIVE DIRECTOR OF THE AGENCY of 28 November 2003 on acceptable means of compliance and guidance material to Commission Regulation (EC) No 2042/2003 of 20 November 2003 on the continuing airworthiness of aircraft and aeronautical products, parts and appliances, and on the approval of organisations and personnel involved in these tasks. This Decision was amended following Decisions: No 2012/004/R of 19 April 2012 No 2011/011/R of 28 November 2011 No 2010/006/R of 31 August 2010 No 2010/002/R of 28 April 2010 No 2009/007/R of 24 March 2009 No 2007/002/R of 13 march 2007 No 2006/11/R of 18 December 2006
	Authority that issued the document:	THE EXECUTIVE DIRECTOR OF THE AGENCY
	Date and place of publication:	Brussels, 28 November 2003
	Date of entry into force:	This Decision was entered into force on the day following its publication in the *Official Publication of the Agency (29/11/2003)*.
	Scope of regulation /standard:	The acceptable means of compliance and guidance material to be used for the continuing airworthiness of aircraft and aeronautical products, parts and appliances, and for the approval of organisations and personnel involved in these tasks in accordance with Commission Regulation (EC) No 2042/2003 are those laid down in the Annexes to this Decision.
	Documents issued under that legislation:	Annex II: Acceptable Means of Compliance to Part-145/ Initial issue (28/11/2003). AMC to Part-145 Current Issue: (AMC to Part-145 has not been published as consolidated version) AMC to Part-145/7 (19/04/2012) – ED Decision 2012/004/R AMC to Part-145/6 (28/11/2011) – ED Decision 2011/011/R AMC to Part-145/5 (07/09/2010) – ED Decision 2010/006/R AMC to Part-145/4 (05/05/2010) – ED Decision 2010/002/R AMC to Part-145/3 (31/03/2009) – ED Decision 2009/007/R AMC to Part-145/2 (20/03/2007) – ED Decision 2007/002/R AMC to Part-145/1 (25/12/2006) – ED Decision 2006/11/R
B7.2	Name of document:	DECISION NO. 2003/19/RM OF THE EXECUTIVE DIRECTOR OF THE AGENCY of 28 November 2003 on acceptable means of compliance and guidance material to Commission Regulation (EC) No 2042/2003 of 20 November 2003 on the continuing airworthiness of aircraft and aeronautical products, parts and appliances, and on the approval of organisations and personnel involved in these tasks. This Decision was amended following Decisions: No 2011/011/R of 28 November 2011 No 2010/006/R of 31 August 2010 No 2010/002/R of 28 April 2010

	Authority that issued the document:	THE EXECUTIVE DIRECTOR OF THE AGENCY
	Date and place of publication:	Brussels, 28 November 2003
	Date of entry into force:	This Decision was entered into force on the day following its publication in the *Official Publication of the Agency (29/11/2003)*.
	Scope of regulation /standard:	The acceptable means of compliance and guidance material to be used for the continuing airworthiness of aircraft and aeronautical products, parts and appliances, and for the approval of organisations and personnel involved in these tasks in accordance with Commission Regulation (EC) No 2042/2003 are those laid down in the Annexes to this Decision.
	Documents issued under that legislation:	Annex III: Guidance Material to Part-145/ Initial issue (28/11/2003). GM to Part-145 Current Issue: (GM to Part-145 has not been published as consolidated version) GM to Part-145/3 (28/11/2011) – ED Decision 2011/011/R GM to Part-145/2 (07/09/2010) – ED Decision 2010/006/R GM to Part-145/1 (05/05/2010) – ED Decision 2010/002/R
B7.3	Name of document:	DECISION NO. 2003/19/RM OF THE EXECUTIVE DIRECTOR OF THE AGENCY of 28 November 2003 on acceptable means of compliance and guidance material to Commission Regulation (EC) No 2042/2003 of 20 November 2003 on the continuing airworthiness of aircraft and aeronautical products, parts and appliances, and on the approval of organisations and personnel involved in these tasks. This Decision was amended following Decisions: No 2012/004/R of 19 April 2012 No 2010/002/R of 28 April 2010 No 2006/01/R of 16 May 2006
	Authority that issued the document:	THE EXECUTIVE DIRECTOR OF THE AGENCY
	Date and place of publication:	Brussels, 28 November 2003
	Date of entry into force:	This Decision was entered into force on the day following its publication in the *Official Publication of the Agency (29/11/2003)*.
	Scope of regulation /standard:	The acceptable means of compliance and guidance material to be used for the continuing airworthiness of aircraft and aeronautical products, parts and appliances, and for the approval of organisations and personnel involved in these tasks in accordance with Commission Regulation (EC) No 2042/2003 are those laid down in the Annexes to this Decision.
	Documents issued under that legislation:	Annex VI: Acceptable Means of Compliance to Part-147/ Initial issue (28/11/2003). AMC to Part-147 Current Issue: (AMC to Part-147 has not been published as consolidated version) AMC to Part-147/3 (19/04/2012) – ED Decision 2012/004/R AMC to Part-147/2 (28/04/2010) – ED Decision 2010/002/R AMC to Part-147/1 (16/05/2006) – ED Decision 2006/01/R

B7.4	Name of document:	DECISION NO. 2003/19/RM OF THE EXECUTIVE DIRECTOR OF THE AGENCY of 28 November 2003 on acceptable means of compliance and guidance material to Commission Regulation (EC) No 2042/2003 of 20 November 2003 on the continuing airworthiness of aircraft and aeronautical products, parts and appliances, and on the approval of organisations and personnel involved in these tasks. This Decision was amended following Decisions: No 2012/004/R of 19 April 2012 No 2010/002/R of 05 May 2010
	Authority that issued the document:	THE EXECUTIVE DIRECTOR OF THE AGENCY
	Date and place of publication:	Brussels, 28 November 2003
	Date of entry into force:	This Decision was entered into force on the day following its publication in the *Official Publication of the Agency (29/11/2003)*.
	Scope of regulation /standard:	The acceptable means of compliance and guidance material to be used for the continuing airworthiness of aircraft and aeronautical products, parts and appliances, and for the approval of organisations and personnel involved in these tasks in accordance with Commission Regulation (EC) No 2042/2003 are those laid down in the Annexes to this Decision.
	Documents issued under that legislation:	Annex VII: Guidance Material to Part-147/ Initial issue (28/11/2003). GM to Part-147 Current Issue: (GM to Part-147 has not been published as consolidated version) GM to Part-147/2 (19/04/2012) – ED Decision 2012/004/R GM to Part-147/1 (05/05/2010) – ED Decision 2010/002/R
B7.5	Name of document:	DECISION NO. 2003/19/RM OF THE EXECUTIVE DIRECTOR OF THE AGENCY of 28 November 2003on acceptable means of compliance and guidance material to Commission Regulation (EC) No 2042/2003 of 20 November 2003 on the continuing airworthiness of aircraft and aeronautical products, parts and appliances, and on the approval of organisations and personnel involved in these tasks. This Decision has been amended by the following Decisions: No 2012/004/R of 19 April 2012 No 2011/008/R of 24 November 2011 No 2011/003/R of 10 May 2010 No 2010/011/R of 21 December 2010 No 2010/002/R of 05 May 2010 No 2009/016/R of 08 December 2009 No 2009/008/R of 31 March 2009 No 2008/003/R of 18 July 2008 No 2007/018/R of 25 December 2007 No 2007/009/R of 02 May 2007 No 2007/003/R of 20 March 2007 No 2005/07/R of 19 December 2005
	Authority that issued the document:	THE EXECUTIVE DIRECTOR OF THE AGENCY
	Date and place of publication:	Brussels, 28 November 2003
	Date of entry into force:	This Decision entered into force on the day following its publication in the *Official Publication of the Agency (29/11/2003)*.

	Scope of regulation /standard:	The acceptable means of compliance and guidance material to be used for the continuing airworthiness of aircraft and aeronautical products, parts and appliances, and for the approval of organisations and personnel involved in these tasks in accordance with Commission Regulation (EC) No 2042/2003 are those laid down in the Annexes to this Decision.
	Documents issued under that legislation:	Annex IV: Acceptable Means of Compliance to Part-66/ Initial issue (28/11/2003). AMC to Part-66 Current Issue: (AMC to Part-66 has not been published as consolidated version) AMC to Part-66/12 (19/04/2012) – ED Decision 2012/004/R AMC to Part-66/11 (24/11/2011) – ED Decision 2011/008/R AMC to Part-66/10 Corrigendum (10/05/2010) – ED Decision 2011/003/R AMC to Part-66/10 (21/12/2010) – ED Decision 2010/011/R AMC to Part-66/9 (05/05/2010) – ED Decision 2010/002/R AMC to Part-66/8 (08/12/2009) – ED Decision 2009/016/R AMC to Part-66/7 (31/03/2009) – ED Decision 2009/008/R AMC to Part-66/6 (18/07/2008) – ED Decision 2008/003/R AMC to Part-66/5 (25/12/2007) – ED Decision 2007/018/R AMC to Part-66/4 (02/05/2007) – ED Decision 2007/009/R AMC to Part-66/3 (20/03/2007) – ED Decision 2007/003/R AMC to Part-66/1 (19/12/2005) – ED Decision 2005/07/R
B7.6	Name of document:	DECISION NO. 2003/19/RM OF THE EXECUTIVE DIRECTOR OF THE AGENCY of 28 November 2003on acceptable means of compliance and guidance material to Commission Regulation (EC) No 2042/2003 of 20 November 2003 on the continuing airworthiness of aircraft and aeronautical products, parts and appliances, and on the approval of organisations and personnel involved in these tasks. This Decision was amended following Decisions: No 2012/004/R of 19 April 2012 No 2010/002/R of 05 May 2010
	Authority that issued the document:	THE EXECUTIVE DIRECTOR OF THE AGENCY
	Date and place of publication:	Brussels, 28 November 2003
	Date of entry into force:	This Decision was entered into force on the day following its publication in the *Official Publication of the Agency (29/11/2003)*.
	Scope of regulation /standard:	The acceptable means of compliance and guidance material to be used for the continuing airworthiness of aircraft and aeronautical products, parts and appliances, and for the approval of organisations and personnel involved in these tasks in accordance with Commission Regulation (EC) No 2042/2003 are those laid down in the Annexes to this Decision.
	Documents issued under that legislation:	Annex III: Guidance Material to Part-66/ Initial issue (28/11/2003). GM to Part-66 Current Issue: (GM to Part-66 has not been published as consolidated version) GM to Part-66/2 (19/04/2012) – ED Decision 2012/004/R GM to Part-66/1 (05/05/2010) – ED Decision 2010/002/R

Appendix B.8 Airports/ Aerodromes

ICAO Annex 14 Manuals

ICAO Doc 4444	Name of document:	ICAO Doc 4444 - Air Traffic Management. 15th Edition
	Authority that issued the document:	ICAO
	Date and place of publication:	2007
	Date of entry into force:	2007
	The territorial range:	191 countries-members
	Scope of regulation /standard:	Complementary to SARPs included in Annex 2 and Annex 11. Chapter 7 contains provisions and procedures applicable by air traffic control units providing aerodrome control service.
	Documents issued under that legislation:	In framework of Annex 14 is Airport Certificate. NAA regulations.
ICAO Doc 8168	Name of document:	ICAO Doc 8168 Aircraft Operations Vol. 1 Flight procedures. 5th Edition
	Authority that issued the document:	ICAO
	Date and place of publication:	2006
	Date of entry into force:	2006
	The territorial range:	191 countries-members
	Scope of regulation /standard:	It describes operational procedures recommended for the guidance of flight operations personnel and flight crew and outlines parameters on which the criteria in Volume II are based so as to illustrate the need to adhere strictly to the published procedures in order to achieve and maintain an acceptable level of safety in operations.
	Documents issued under that legislation:	NAA regulations.
ICAO Doc 8168	Name of document:	ICAO Doc 8168 Aircraft Operations Vol. 2 Construction of Visual and Instrument Flight Procedures. 5th Edition
	Authority that issued the document:	ICAO
	Date and place of publication:	2006
	Date of entry into force:	2006
	The territorial range:	191 countries-members
	Scope of regulation /standard:	The document is a guidance of procedures specialists and describes the areas and obstacle clearance requirements for the achievement of safe, regular instrument flight operation.
	Documents issued under that legislation:	NAA regulations.
ICAO Doc 9137	Name of document:	ICAO Doc 9137 Airport Services Manual, Part 1. Rescue and Fire Fighting. 3rd Edition
	Authority that issued the document:	ICAO

	Date and place of publication:	1990
	Date of entry into force:	1990
	The territorial range:	191 countries-members
	Scope of regulation /standard:	In accordance with Annex 14. The purpose of the material is to assist States in the implementation of these specifications and thereby help to ensure their uniform application.
	Documents issued under that legislation:	In framework of Annex 14 is Airport certificate. NAA regulations.
ICAO Doc 9137	Name of document:	ICAO Doc 9137 Airport Services Manual, Part 2. Pavement Surface Conditions. 4th Edition
	Authority that issued the document:	ICAO
	Date and place of publication:	2002
	Date of entry into force:	2002
	The territorial range:	191 countries-members
	Scope of regulation /standard:	The purpose of this manual is to provide assistance to States in ensuring that adequate measures are taken to overcome problem resulting from contaminants or debris on, or weathering of, the movement area.
	Documents issued under that legislation:	In framework of Annex 14 is Airport certificate. NAA regulations.
ICAO Doc 9137	Name of document:	ICAO Doc 9137 Airport Services Manual, Part 3. Bird Control and Reduction. 3rd Edition
	Authority that issued the document:	ICAO
	Date and place of publication:	1991
	Date of entry into force:	1991
	The territorial range:	191 countries-members
	Scope of regulation /standard:	The purpose of this manual is to provide assistance to States in ensuring that adequate measures are taken to overcome potential bird hazard. According to the provisions of Annex 14.
	Documents issued under that legislation:	In framework of Annex 14 is Airport certificate. NAA regulations.
ICAO Doc 9137	Name of document:	ICAO Doc 9137 Airport Services Manual, Part 4.Removal or Disabled Aircraft. 4th Edition
	Authority that issued the document:	ICAO
	Date and place of publication:	2009
	Date of entry into force:	2009
	The territorial range:	191 countries-members
	Scope of regulation /standard:	This manual contains updated guidance on the removal of disabled aircraft and is intended to be used by airport and aircraft operators planning for the processes require to recover an aircraft

	Documents issued under that legislation:	In framework of Annex 14 is Airport certificate. NAA regulations.
ICAO Doc 9137	Name of document:	ICAO Doc 9137 Airport Services Manual, Part 6. Control of Obstacles. 2nd Edition
	Authority that issued the document:	ICAO
	Date and place of publication:	1983
	Date of entry into force:	1983
	The territorial range:	191 countries-members
	Scope of regulation /standard:	This part of the ASM is guidance on the control of obstacles in the vicinity of airports. Much of material included herein is closely associated with the specification contained in Annex 14.
	Documents issued under that legislation:	In framework of Annex 14 is Airport certificate. NAA regulations.
ICAO Doc 9137	Name of document:	ICAO Doc 9137 Airport Services Manual, Part 7. Airport Emergency Planning. 2nd Edition
	Authority that issued the document:	ICAO
	Date and place of publication:	1991
	Date of entry into force:	1991
	The territorial range:	191 countries-members
	Scope of regulation /standard:	The purpose of the material in this manual is to Assist States in the implementation of an emergency plan and thereby to help to ensure their uniform application. In accordance to the Annex 14.
	Documents issued under that legislation:	In framework of Annex 14 is Airport certificate. NAA regulations.
ICAO Doc 9137	Name of document:	ICAO Doc 9137 Airport Services Manual, Part 8. Airport operational Service. 1st Edition
	Authority that issued the document:	ICAO
	Date and place of publication:	1983
	Date of entry into force:	1983
	The territorial range:	191 countries-members
	Scope of regulation /standard:	The purpose of this manual is to bring under one cover a compilation of various technical functions that are required to be fulfilled by an airport. According to the Annex 14.
	Documents issued under that legislation:	In framework of Annex 14 is Airport certificate. NAA regulations.
ICAO Doc 9137	Name of document:	ICAO Doc 9137 Airport Services Manual, Part 9. Airport Maintenance Practices. 1st edition
	Authority that issued the document:	ICAO
	Date and place of publication:	1984

	Date of entry into force:	1984
	The territorial range:	191 countries-members
	Scope of regulation /standard:	This manual consolidates in one document a review of the maintenance practices required at an airport to maintain the safety, efficiency and regularity of aircraft operations.
	Documents issued under that legislation:	In framework of Annex 14 is Airport certificate. NAA regulations.
ICAO Doc 9150	Name of document:	ICAO Doc 9150 Stolport Manual. 2nd Edition
	Authority that issued the document:	ICAO
	Date and place of publication:	1991
	Date of entry into force:	1991
	The territorial range:	191 countries-members
	Scope of regulation /standard:	This manual provides guidance for the planning and establishment of stolports, unique airports designed to serve aeroplanes that have exceptional short-field performance capabilities.
	Documents issued under that legislation:	NAA regulations.
ICAO Doc 9150	Name of document:	ICAO Doc 9157 Aerodrome Design Manual. Part 1. Runways. 3rd Edition
	Authority that issued the document:	ICAO
	Date and place of publication:	2006
	Date of entry into force:	2006
	The territorial range:	191 countries-members
	Scope of regulation /standard:	This part of the ADM fulfils the requirement for guidance material on the geometric design of runways and associated airport elements, namely, runway shoulders, runway strip, runway end safety areas, clearways and stopways.
	Documents issued under that legislation:	In framework of Annex 14 is Airport certificate. NAA regulations.
ICAO Doc 9150	Name of document:	ICAO Doc 9157 Aerodrome Design Manual. Part 2. Taxiways, Aprons and Holding Bays. 4th Edition
	Authority that issued the document:	ICAO
	Date and place of publication:	2005
	Date of entry into force:	2005
	The territorial range:	191 countries-members
	Scope of regulation /standard:	The purpose of the following material is to assist States in the implementation of specification concerning taxiways, holding bays and aprons.
	Documents issued under that legislation:	In framework of Annex 14 is Airport certificate. NAA regulations.
ICAO Doc 9150	Name of document:	ICAO Doc 9157 Aerodrome Design Manual. Part 3. Pavements. 2nd Edition

	Authority that issued the document:	ICAO
	Date and place of publication:	1983
	Date of entry into force:	1983
	The territorial range:	191 countries-members
	Scope of regulation /standard:	This document includes guidance on the design of pavements including their characteristics and on evaluation and reporting of their bearing strength.
	Documents issued under that legislation:	In framework of Annex 14 is Airport certificate. NAA regulations.
ICAO Doc 9150	Name of document:	ICAO Doc 9157 Aerodrome Design Manual. Part 4. Visual Aids 4th Edition.
	Authority that issued the document:	ICAO
	Date and place of publication:	2004
	Date of entry into force:	2004
	The territorial range:	191 countries-members
	Scope of regulation /standard:	This material is closely associated with the specification contained in Annex 14 – Aerodromes, Volume I – Aerodrome Design and Operations. The main purpose of the manual is to assist States in the implementation of these specifications and thereby help to ensure their uniform application.
	Documents issued under that legislation:	In framework of Annex 14 is Airport certificate. NAA regulations.
ICAO Doc 9150	Name of document:	ICAO Doc 9157 Aerodrome Design Manual. Part 5. Electrical System. 1st Edition
	Authority that issued the document:	ICAO
	Date and place of publication:	1983
	Date of entry into force:	1983
	The territorial range:	191 countries-members
	Scope of regulation /standard:	This manual provides guidance on the design and installation of electrical systems for aerodrome lighting and radio navigation aids.
	Documents issued under that legislation:	In framework of Annex 14 is Airport certificate. NAA regulations.
ICAO Doc 9150	Name of document:	ICAO Doc 9157 Aerodrome Design Manual. Part 6. Frangibility. 1st Edition
	Authority that issued the document:	ICAO
	Date and place of publication:	2005
	Date of entry into force:	2005
	The territorial range:	191 countries-members

	Scope of regulation /standard:	The purpose of this manual is to assist States in the implementation of specifications on frangibility of visual and non-visual aids and thereby help to ensure their uniform application.
	Documents issued under that legislation:	In framework of Annex 14 is Airport certificate. NAA regulations.
ICAO Doc 9184	Name of document:	ICAO Doc 9184 Airport Planning Manual. Part 1. Master Planning. 2nd Edition
	Authority that issued the document:	ICAO
	Date and place of publication:	1987
	Date of entry into force:	1987
	The territorial range:	191 countries-members
	Scope of regulation /standard:	The guidance is purposed to assist the States in planning the expansion of existing international airports and the construction of new ones.
	Documents issued under that legislation:	In framework of Annex 14 is Airport certificate. NAA regulations.
ICAO Doc 9184	Name of document:	ICAO Doc 9184 Airport Planning Manual. Part 2. Land Use and Environmental Control. 3rd Edition
	Authority that issued the document:	ICAO
	Date and place of publication:	2002
	Date of entry into force:	2002
	The territorial range:	191 countries-members
	Scope of regulation /standard:	The purpose of this part of the manual is to provide guidance material on land-use planning in the vicinity of airports and on environmental control regarding airport development and operations.
	Documents issued under that legislation:	In framework of Annex 14 is Airport certificate. NAA regulations.
ICAO Doc 9184	Name of document:	ICAO Doc 9184 Airport Planning Manual. Part 3. Guidelines for Consultant/construction services. 1st Edition
	Authority that issued the document:	ICAO
	Date and place of publication:	1983
	Date of entry into force:	1983
	The territorial range:	191 countries-members
	Scope of regulation /standard:	This manual provides a general overview on contracting for planning or construction services. It is intended for both persons who are directly involved in the preparation and administration of a contract as well as supervisors of such persons.
	Documents issued under that legislation:	In framework of Annex 14 is Airport certificate. NAA regulations.
ICAO Doc 9261	Name of document:	ICAO Doc 9261 Heliport Manual. 3rd Edition
	Authority that issued the document:	ICAO

	Date and place of publication:	1995
	Date of entry into force:	1995
	The territorial range:	191 countries-members
	Scope of regulation /standard:	The purpose of this document is to provide guidance in implementing of specification concerning planning design and operation as well as applicability of visual aids.
	Documents issued under that legislation:	In framework of Annex 14 is Airport certificate. NAA regulations.
ICAO Doc 9332	Name of document:	ICAO Doc 9332 Manual on the ICAO Bird Strike Information System (IBIS) 3rd Edition
	Authority that issued the document:	ICAO
	Date and place of publication:	1989
	Date of entry into force:	1989
	The territorial range:	191 countries-members
	Scope of regulation /standard:	This manual describes the reporting system designed to collect and disseminate information on bird strikes which occur as a result of a collision between an aircraft and a bird.
	Documents issued under that legislation:	In framework of Annex 14 is Airport certificate. NAA regulations.
ICAO Doc 9426	Name of document:	ICAO Doc 9426 Air Traffic Service Planning Manual. 1st Edition
	Authority that issued the document:	ICAO
	Date and place of publication:	1984
	Date of entry into force:	1984
	The territorial range:	191 countries-members
	Scope of regulation /standard:	The material in this document is intended to supplement the provisions governing ATS as specified in Annexes 2 and 11 and the PANS-RAC. It contains information which should be taken into account in the formulation of development programmes within States or regions and material which should be applied directly to the planning and operation of the ATS system.
	Documents issued under that legislation:	In framework of Annex 14 is Airport certificate. NAA regulations.
ICAO Doc 9476	Name of document:	ICAO Doc 9476 Manual of Surface Movement Guidance and Control Systems (SMGCS) 1st Edition
	Authority that issued the document:	ICAO
	Date and place of publication:	1986
	Date of entry into force:	1986
	The territorial range:	191 countries-members

	Scope of regulation /standard:	This Manual has been developed to facilitate the implementation of the specifications related to SMGC systems in the various Annexes and the PANS-RAC
	Documents issued under that legislation:	NAA regulations.
ICAO Doc 9640	Name of document:	ICAO Doc 9640 Manual of Aircraft Ground De-Icing/Anti-Icing Operations. 2nd Edition
	Authority that issued the document:	ICAO
	Date and place of publication:	2000
	Date of entry into force:	2000
	The territorial range:	191 countries-members
	Scope of regulation /standard:	The document comprises a summary of information essential to the planning and execution of de-icing/anti-icing operations during conditions which are conductive to Aeroplane icing on the ground.
	Documents issued under that legislation:	NAA regulations.
ICAO Doc 9643	Name of document:	ICAO Doc 9643 Manual on Simultaneous Operations on Parallel or Near-Parallel Instrument Runways (SOIR) 1st Edition
	Authority that issued the document:	ICAO
	Date and place of publication:	2004
	Date of entry into force:	2004
	The territorial range:	191 countries-members
	Scope of regulation /standard:	This manual is intended to facilitate implementation of related provisions in Annex 14, Doc 4444 and Doc 8168 concerning SOIR.
	Documents issued under that legislation:	NAA regulations.
ICAO Doc 9760	Name of document:	ICAO Doc 9760 Airworthiness Manual 2nd Edition
	Authority that issued the document:	ICAO
	Date and place of publication:	2001
	Date of entry into force:	2001
	The territorial range:	191 countries-members
	Scope of regulation /standard:	The annual provide guidance on the suggested content of State airworthiness regulations.
	Documents issued under that legislation:	NAA regulations.
ICAO Doc 9774	Name of document:	ICAO Doc 9774 Manual on Certification of Aerodromes. 1st Edition
	Authority that issued the document:	ICAO
	Date and place of publication:	2001
	Date of entry into force:	2001

	The territorial range:	191 countries-members
	Scope of regulation /standard:	The purpose of this manual is to provide guidance to States in establishing their regulatory system for the certification of land aerodromes.
	Documents issued under that legislation:	In framework of Annex 14 is Airport certificate. NAA regulations
ICAO Doc 9829	Name of document:	ICAO Doc 9829 Guidance on the Balanced Approach to Aircraft Noise Management. 2nd Edition
	Authority that issued the document:	ICAO
	Date and place of publication:	2008
	Date of entry into force:	2008
	The territorial range:	191 countries-members
	Scope of regulation /standard:	This guidance material described the principal elements of the Balanced Approach, some of the measures available under each element, the relationship between the elements and the measures, and the analytical and methodological tools that might be used to assess and compare their costs and benefits.
	Documents issued under that legislation:	NAA regulations.
ICAO Doc 9830	Name of document:	ICAO Doc 9830 Advanced Surface Movement Guidance and Control Systems (A-SMGCS) Manual. 1st Edition
	Authority that issued the document:	ICAO
	Date and place of publication:	2004
	Date of entry into force:	2004
	The territorial range:	191 countries-members
	Scope of regulation /standard:	The performance requirement contained in this manual are intended to provide a possible solution to safety- or capacity-related problems.
	Documents issued under that legislation:	NAA regulations.
ICAO Doc 9859	Name of document:	ICAO Doc 9859 Safety Management Manual (SMM) 2nd Edition
	Authority that issued the document:	ICAO
	Date and place of publication:	2009
	Date of entry into force:	2009
	The territorial range:	191 countries-members
	Scope of regulation /standard:	This manual is intended to provide States with guidance to develop the regulatory framework and the supporting guidance material for the implementation of safety management systems (SMS) by service providers.
	Documents issued under that legislation:	In framework of Annex 14 is Airport certificate. NAA regulations.

Appendix C Indication on potential bottlenecks'/shortcomings' consequence and recommendations how to proceed

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Importance of scenario	Accident/ Incident	Potential consequences	N° Recommendation	Recommendation how to proceed
High	LOC-I (Loss Of Control in Flight)	Nearly alarming trend in change of number of fatal accidents in this category. Very often leads to severe fatal accidents.	R1_LOC-I	In many cases human error can be identified as direct cause of the accident both when piloting as maintenance are taken into consideration. Elaboration of design techniques in area of piloting as well as maintenance better addressing the avoiding of error-prone solutions. Necessity of developing adequate regulations.
High	CFIT (Controlled Flight Into Terrain)	One of the critical accident types. However the number of CFIT accident significantly decreased in recent years. It represents optimistic trend.	R2_CFIT	Human error is dominating casual factor in CFIT accidents. Besides improved methodology of pilot training it is also crucial to develop less error-prone solutions in terms of human –machine interface to minimise the risk of loss situational awareness due to misreading flight instrument indication.
High	RE (Runway Excursion)	Poor improvement in recent years. Increased air traffic at main airports can lead to higher risk related to RE accidents.	R3_RE	Similarly to above the runway excursion related accidents and incidents' causes lie in human errors. Lack of procedures eliminating error-prone solutions. Elaboration of tools ensuring proper and full execution of ICAO Annex 14 SARPs at Aerodromes. Lack of a regulatory requirement to provide flight crews a consistent format of take-off and landing data for all runway conditions. Inadequate regulation for the provision of correct, up-to-date and timely runway condition reports. No international standard for measuring and reporting runway conditions. Preparation of regulations allowing for shifting a part of pilot responsibilities to developed automatic flight control systems.
High	UAP (Unauthorised penetration of airspace or airspace infringements)	Considerable increase in 2011. Potential risk due to growing air traffic.	R4_UAP	Human error is dominating causal factor in UAP accidents as well. Besides improved methodology of pilot training it is also crucial to develop less error-prone solutions in terms of human –machine interface to minimise the risk of loss situational awareness due to misreading flight instrument indication. Recommendations as above. Less loaded pilots. Preparation of adequate regulations.
High	SMI (Separation Minima Infringement)	Year-to-year increase in almost all recent years. High statistical severity of SMI accidents. Worrying trend.	R5_SMI	Similarly to UAP, SMI type accidents results mainly from ATCO errors. There is a necessity of elaboration of air traffic management techniques and procedures addressing more efficient communication and data transfer as well as avoiding of error-prone solutions. Recommendations as above. Preparation of adequate regulations.

Importance of scenario	Accident/ Incident	Potential consequences	N° Recommendation	Recommendation how to proceed
Medium	CLR (aircraft deviation of ATC clearance including Level Bust)	Similarly as SMI category accidents. There is a need for improvement due to increased number of safety occurrences not classified in terms of severity	R6_CLR	Similarly to UAP, SMI also CLR type accidents results mainly from ATCO errors. There is a necessity of elaboration of air traffic management techniques and procedures addressing more efficient communication and data transfer as well as avoiding of error-prone solutions.
Medium	RI (Runway Incursion)	The situation is more or less stable. Nevertheless increased traffic at main airports leads to the conclusion that it is also high risk area.	R7_RI	Similarly to UAP and SMI RI type accidents results mainly from ATCO errors. There is a necessity of elaboration of air traffic management techniques and procedures addressing more efficient communication and data transfer as well as avoiding of error-prone solutions. Elaboration of tools ensuring proper and full execution of ICAO Annex 14 SARPs at Aerodromes. Implementation of regulation enabling airport site traffic management automation. With pressure placed on blockade on wrong decision execution.
Medium	IS (Inadequate Separation)	The situation is more or less stable. Nevertheless increased traffic at main airports leads to the conclusion that it is also high risk area.	R8_IS	Similarly to UAP, SMI also IS type accidents results mainly from ATCO errors. There is a necessity of elaboration of air traffic management techniques and procedures addressing more efficient communication and data transfer as well as avoiding of error-prone solutions.* Recommendation as above.

Appendix D Bottlenecks and shortcomings from existing studies

This appendix provides an overview of bottlenecks and shortcomings in certification processes and regulations as identified from existing studies.

Appendix D.1 FAA commercial airplane certification process study

The FAA's commercial airplane certification process study [7] provides an evaluation of selected aircraft certification, operations, and maintenance processes. In its appendix B, it lists a summary of their findings and observations, several of which are also applicable to Europe and are still applicable to the situation of today. In the following three figures this summary is copied.

Focus Area	Category	Findings and Observations	
Airplane Safety Assurance Processes	Human Factors Issues in Design, Operations, and Maintenance	**Finding 1**	*Human performance is still the dominant factor in accidents:* • *The processes used to determine and validate human responses to failure and methods to include human responses need to be improved.* • *Design techniques, safety assessments, and regulations do not adequately address the subject of human error in design or in operations and maintenance.*
	Correlation of Safety Assumptions with Operations and Maintenance Practices	**Finding 2**	*There is no reliable process to ensure that assumptions made in the safety assessments are valid with respect to operations and maintenance activities, and that operators are aware of these assumptions when developing their operations and maintenance procedures. In addition, certification standards may not reflect the actual operating environment.*
	Robust Safety Assessments and Design for Critical Functions	**Finding 3**	*A more robust approach to design and a process which challenges the assumptions made in the safety analysis of flight critical functions is necessary in situations where a few failures (2 or 3) could result in a catastrophic event.*
	Flight Critical Systems and Structure	**Finding 4**	*Processes for identification of safety critical features of the airplane do not ensure that future alterations, maintenance, repairs, or changes to operational procedures can be made with cognizance of those safety features.*
Aviation Safety Data Management	Coordination of Data Management Systems	**Finding 5**	*Multiple FAA-sponsored data collection and analysis programs exist without adequate inter-departmental coordination or executive oversight.*
	Data Definition and Reporting Requirements	**Finding 6**	*Basic data definition and reporting requirements are poorly defined relative to the needs of analysts and other users.*
	Identification of Accident Precursors	**Finding 7**	*There is no widely accepted process for analyzing service data or events to identify potential accident precursors.*

Focus Area	Category	Findings and Observations	
Maintenance/ Operations/ Certification Interfaces	Capturing the Lessons Learned From Design, Manufacturing, Maintenance, and Operating Experience	**Finding 8**	*Adequate processes do not exist within the FAA or in most segments of the commercial aviation industry to ensure that the lessons learned from specific experiences in airplane design, manufacturing, maintenance, and flight operations are captured permanently and made readily available to the aviation industry. The failure to capture and disseminate lessons learned has allowed airplane accidents to occur for causes similar to those of past accidents.*
	Constraints on the Sharing of Safety Information	**Finding 9**	*There are constraints present in the aviation industry that have an inhibiting effect on the complete sharing of safety information.*
Maintenance/ Operations/ Certification Interfaces (Cont.)	Maintenance and Operational Safety Recommendations and Feedback Between Operators and OEMs	**Finding 10**	*There are currently no industry processes or guidance materials available which ensure that:* • *Safety related maintenance or operational recommendations developed by the OEM are evaluated by the operator for incorporation into their maintenance or operational programs; and* • *Safety related maintenance or operational procedures developed or modified by the operator are coordinated with the OEM to ensure that they do not compromise the type design safety standard of the airplane and its systems.*
	Communication and Coordination Between Aircraft Certification Service and Flight Standards Service	**Finding 11**	*The absence of adequate formal business processes between FAA Aircraft Certification Service and Flight Standards Service limits effective communication and coordination between the two that often results in inadequate communications with the commercial aviation industry.*

Focus Area	Category	Findings and Observations	
Major Repairs and Modifications	Classification of Repairs and Alterations	**Finding 12**	*The airline industry and aircraft repair organizations do not have a standardized process for classifying repairs or alterations to commercial aircraft as "Major" as prescribed by applicable Federal Aviation Regulations (FARs).*
	Quality of Alterations and Repair Processes	**Finding 13**	*Inconsistencies exist between the safety assessments conducted for the initial type certificate (TC) of an airplane and some of those conducted for subsequent alterations to the airplane or systems. Improved FAA and industry oversight of repair and alteration activity is needed to ensure that safety has not been compromised by subsequent repairs and alterations.*
	Airworthiness Directive/Service Bulletin Information Flow to Field Reference Materials	**Observation 1**	*OEM and operators' maintenance manuals, illustrated parts catalogs (IPC), wiring diagrams, and other documents needed to maintain aircraft in an airworthy configuration after incorporation of service bulletins (SB) and airworthiness directives (AD), are not always revised to reflect each aircraft's approved configuration at the time the modifications are implemented.*
Safety Oversight Processes	People and Process for Oversight of DERs	**Finding 14**	*Consultant DERs have approved designs that were deficient or non-compliant with FAA regulations.*
	Detection of Single Point Human Error	**Finding 15**	*Processes to detect and correct errors made by individuals in the design, certification, installation, repair, alteration, and operation of transport airplanes are inconsistent allowing unacceptable errors in critical airworthiness areas.*
	Oversight Processes and Resources: Industry	**Observation 2**	*Some air carriers do more extensive oversight than others of their in-house and outsourced flight operations and maintenance activities, with major safety and economic benefits.*

Appendix D.2 Nimrod review

The Nimrod review [29] identifies bottlenecks in the use of safety cases in military aviation, and provides associated recommendations, both of which are of potential relevance for civil aviation as well. Considering the scope of the current document, we restrict to quoting the summarised bottlenecks:

1. The Safety Case regime has lost its way. It has led to a culture of 'paper safety' at the expense of real safety. It currently does not represent value for money.
2. The current shortcomings of Safety Cases in the military environment include:
    - bureaucratic length;
    - their obscure language;
    - a failure to see the wood for the trees;
    - archaeological documentary exercises;
    - routine outsourcing to Industry; lack of vital operator input;
    - disproportionality;
    - ignoring of age issues;
    - compliance-only exercises;
    - audits of process only; and
    - prior assumptions of safety and 'shelf-ware'.
3. Many of these criticisms of Safety Cases are not new: see the Ladbroke Grove Rail Inquiry and the writings of Professor McDermid's Department at the University of York pointing the poor quality of safety cases construction.
4. Safety Cases were intended to be an aid to thinking about risk but have become an end in themselves.

Appendix D.3 SESAR Definition phase WP1.6.1/D1

SESAR [30] gives an overview of the current ATM safety regulatory framework. It describes how the implementation of global regulation has been the responsibility of individual States, that this has led to a considerable variability in interpretation and implementation, and how in recent years a third layer of ATM safety regulation has been added in Europe. It states that ATM safety regulation has been successful in delivering an acceptably safe ATM system across Europe, but that there are many issues with the way the current arrangements are working. Main issues are in the field of:

1. Fragmentation and variability in regulations and their interpretation: e.g., states applying ICAO and European safety regulations with little changes, and others interpreting and supplementing them. This allows flexibility but leads to a lack of harmonisation and inconsistency in standards.
2. Safety accountability: The complex safety regulatory framework and the often detailed and prescriptive nature of safety regulations can result in confusion over safety accountability. "It is frequently not clear who is responsible for ensuring that regulatory requirements are met. Such an uncertainty might introduce risk into an ATM system."
3. Duplication of regulations: overlap and contradictions leading to confusion and difficulty (e.g., because of the three layers of safety regulation described above). This also includes unclearness for aircraft

manufacturers about the relationship between EC legislation (e.g. Single European Sky) and EASA regulation is also unclear ("Ideally EASA should be the only authority for the airborne industry, therefore the relationship between EASA and the EC needs to be clarified".

4. Complexity of regulation, leading to difficulty to comply.
5. Transparency: "ATM regulations have sometimes little traceability between the requirements and the safety objectives that they are trying to achieve (...). Such a lack of transparency presents difficulties when introducing innovative solutions as it is not straightforward to demonstrate that the new solution delivers equivalent or better safety performance."
6. Harmonisation of industry regulation; "ATM safety is only a small element of the safety of air transport and safety is only one part of the overall regulatory and legislative framework that applies to ATM. There is a lack of harmonisation in safety regulation between different industry segments including uncoordinated safety targets, different approaches to safety assessments and different classification schemes for causal factors in incidents. This is a particular issue for equipment providers that must comply with their own regulatory requirements and standards as well as those passed on from the end users of their systems. The interfaces between safety regulation and other types of regulation (environmental, security etc.) are also unclear.";
7. Proportionality and cost effectiveness: it is not possible to determine whether ATM safety regulation is cost-effective, nor whether resources are being deployed in a way that will minimise risk.

Main conclusion of the document is that developing the ATM safety regulatory framework to provide a clear, unambiguous set of regulations integrated with the safety regulation of the other parts of the air transport industry will be essential to the success of SESAR.

Appendix D.4 EASA Opinion 02/2010

EASA [31] presents a view on ESARR and EC regulations in ATM, based on consultation of stakeholders. EASA presents a number of areas where improvement would be necessary regarding the regulations on safety assessments in ATM. These are copied as follows:

- The existing provisions are too difficult to interpret and even to apply in some cases. Terms such as 'constituent part', 'ATM-related credible hazards' and the application of the required quantitative methodology and of the severity class table in the case of changes related to human and procedures were not easy to interpret and neither have they been uniformly, if at all, applied among different Member States.
- The criteria provided to the competent authorities for their decision whether or not to review the change proposed by the organisation would also need to be improved, as the existing criteria, based on hazards rather than risks, ultimately mean that the competent authority should review almost all the changes
- The Agency considers that there would be significant benefits to implement a more performance-based approach for regulating safety assessment of changes and for their safety oversight. By streamlining the requirements and the associated responsibilities for the management of changes,

clarifying the associated processes for notification and review of the changes at the level of the implementing rules and by providing the methodologies to be used for the different type of changes to different type of functional systems in AMCs (Accepted Means of Compliance) and GMs (Guidance Material), the requirements would be more easily understood and applied. The Agency considers that only when the requirements are clear and easy to interpret and when the responsibilities and processes are clearly allocated, the requirements can be uniformly applied and safety enhanced.

- The lack of AMCs and GMs under the SES regulatory framework made it difficult to adopt such a system for the initial set of the SES Regulations. However, the EASA regulatory framework offers this possibility. Based on the experience gained so far with the application of AMCs and GMs within other fields of aviation (e.g. airworthiness and maintenance) and on the existing proposals for dealing with alternatives AMCs, the desired level of harmonisation within the European Union — very much required for the development and safely functioning of the Functional Airspace Blocks (FAB) and the Single European Sky — will be guaranteed. This will also encourage flexibility, by allowing standardised approaches that best suit the type of change and operations under consideration, without the need to change the Regulation or request for derogations. It will also provide the means to develop and update these approaches to embrace the latest best practices.
- Based on the initial regulatory impact assessment conducted by the Agency when assessing the possible options to enhance these provisions, the Agency's preferred option would have been to streamline the implementing rules by making them more performance-based. The implementing rules would have contained the safety objectives needed to be met and the AMCs and GMs would have contained the technical details on how to meet the safety objectives. This approach has already been adopted for the airworthiness certification of aircraft, and it would also be more appropriate for the ATM/ANS field which is very dependent on technology and which is based more and more on highly complex and air-ground integrated systems.

Since then, EASA has adapted the regulations in a 'fast-track' process for the accelerated transposition of existing SES rules to EASA. This fast-track process addressed only a set of minimum necessary changes, mostly of a technical nature, and resulted in e.g., EU 1035/2011 and EU 1034/2011. Currently developments take place for addressing identified bottlenecks.