

**NOTICE OF PROPOSED AMENDMENT (NPA) No 2007-16**

**Extension of the EASA system to the regulation of Air Traffic Management and Air Navigation Services (ATM/ANS)**

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## A. Explanatory Note

### I. General

1. The purpose of this Notice of Proposed Amendment (NPA) is to envisage amending REGULATION (EC) No 1592/2002 of the EUROPEAN PARLIAMENT and of the COUNCIL of 15 July 2002 on common rules in the field of civil aviation and establishing a European Aviation Safety Agency (the Basic Regulation<sup>1</sup>) extend its scope to the safety and interoperability regulation of air traffic management and air navigation services (ATM/ANS). The scope of this rulemaking activity is outlined in ToR BR.003 and is described in more detail below.
2. The Agency is directly involved in the rule-preparation process. It assists the Commission in its executive tasks by developing draft regulations, and amendments thereof, for the implementation of the Basic Regulation which are adopted as "Opinions" (Article 14(1)). It also adopts Certification Specifications, including Airworthiness Codes and Acceptable Means of Compliance and Guidance Material to be used in the certification process (Article 14(2)).
3. When developing rules, the Agency is bound to following a structured process as required by Article 43(1) of the Basic Regulation. Such process has been adopted by the Agency's Management Board and is referred to as "The Rulemaking Procedure"<sup>2</sup>.
4. This rulemaking activity is included in the Agency's rulemaking programme for 2008. It implements the rulemaking task BR.003.
5. The text of this NPA has been developed by the Agency. It is submitted for consultation of all interested parties in accordance with Article 43 of the Basic Regulation and Articles 5(3) and 6 of the Rulemaking Procedure.

### II. Consultation

6. To achieve optimal consultation, the Agency is publishing the draft decision of the Executive Director on its internet site. Comments should be provided within 6 weeks in accordance with Article 6(5) of the Rulemaking Procedure. Comments on this proposal should be submitted by one of the following methods:

**CRT:** Send your comments using the Comment-Response Tool (CRT) available at <http://hub.easa.europa.eu/crt/>

**E-mail:** In case the use of CRT is prevented by technical problems these should be reported to the [CRT webmaster](mailto:CRT_webmaster@easa.europa.eu) and comments sent by email to NPA@easa.europa.eu.

**Correspondence:** If you do not have access to internet or e-mail you can send your comment by mail to:  
Process Support  
Rulemaking Directorate  
EASA  
Postfach 10 12 53  
D-50452 Cologne  
Germany

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<sup>1</sup> Regulation (EC) No 1592/2002 of the European Parliament and of the Council of 15 July 2002 on common rules in the field of civil aviation and establishing a European Aviation Safety Agency. *OJ L 240, 7.9.2002, p. 1*. Regulation as last amended by Regulation (EC) No 334/2007 (*OJ L 88, 29.3.2007, p. 39*).

<sup>2</sup> Management Board decision concerning the procedure to be applied by the Agency for the issuing of opinions, certification specifications and guidance material ("Rulemaking Procedure"), EASA MB 08-2007, 13.6.2007

Comments should be received by the Agency before 11 January 2008. If received after this deadline they might not be taken into account.

7. A shorter consultation period has been chosen to answer the request of the Commission to provide an opinion in due time to meet its own objective to issue a legislative proposal addressing the safety regulation of Air Traffic Management and Air Navigation Services before summer 2008. As the concerned stakeholders are already subject to Community legislation in this field and the main changes envisaged under the current proposal primarily affect service providers, which are well established and organised legal persons, it is thought that they can answer within that period to the questions raised by this NPA. Moreover the Commission proposal will have to undergo a full legislative process under the co-decision procedure that will give ample opportunities for all stakeholders to make their views known and to defend their interests.

### **III. Comment response document**

8. All comments received in time will be responded to and incorporated in a comment response document ("CRD"). The CRD will be available on the Agency's website and in the Comment-Response Tool ("CRT").

### **IV. Content of the Notice of Proposed Amendment**

#### **General:**

9. A basic principle underlying the aviation policy of the European Union has been that a high and uniform level of safety can be best attained through common action at Community level and therefore high and uniform protection of the citizens will be ensured by the adoption of common safety rules and by ensuring that products, persons and organisations involved in the execution of safety critical functions comply with such rules. This was the main grounds for the European legislator to establish a common safety regulatory framework and as a central element of it to set up the European Aviation Safety Agency (EASA) as an independent safety regulator. This objective was achieved by the adoption of the Basic Regulation.
10. As a first step the Basic Regulation included provisions necessary to ensure the airworthiness and environmental compatibility of aircraft, including personnel and organisations involved in their design, production and maintenance. Further work was then undertaken to properly address all other fields of aviation safety. The aviation system behaves as a network with all parts interacting with each other - fragmentation at any level would be a significant impediment to the efficient functioning of the overall network. Therefore, the objective of a high and uniform level of safety could only be attained through progressively harmonising the requirements applicable across all domains of aviation safety. The scope of the EASA system was therefore to be extended progressively to cover these other aspects of safety, building on a total system approach.
11. The legislative process by the EU Council and the European Parliament for the first extension of the Basic Regulation is in its very final stages. The scope of the EASA system will then cover the safety of operations by nearly any aircraft<sup>3</sup> used by a Community operator or operated in the territory of Member States, the licensing of flight crew

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<sup>3</sup> Annex II of the Basic Regulation excludes some rare aircraft as well as ultra-light aircraft that remain under national surveillance.

members and safety approvals of third country operations in the Community. This extended Basic Regulation should enter into force in the very near future.

12. As a following step work had to be done to prepare proposals for the safety and interoperability regulation of aerodromes, air traffic management and air navigation services. The preliminary impact assessment launched by the Commission indeed concluded that the extension of the EASA system was the most favourable option to achieve the objective described above in paragraph 10. According to the Commission, the Agency is to prepare, implement and monitor the application of safety rules, and is set to become by 2010 the European authority with extended powers covering all aspects of civil aviation safety. When considering this second extension of the Basic Regulation the Agency found it appropriate to distinguish aerodrome regulation from that of ATM/ANS. Aerodromes have indeed for their prime objective to provide for the safety of an individual aircraft by ensuring that the appropriate means are provided to allow its safe take off and landing, while ATM/ANS aim at managing its interaction with other aircraft in all phases of flight and on the movement area of an aerodrome. As a consequence, the risks associated to these two types of activity are fundamentally different and the related mitigating measures to be enforced by regulation need to be addressed separately in order to avoid overlap and confusion.
13. As regards extending the EASA system to cover the safety regulation of aerodromes, the rulemaking activities of the Agency are being finalised and its formal Opinion on the matter will be soon issued. This opinion establishes a comprehensive and broadly consensual basis for a legislative proposal by the European Commission.
14. When preparing the extension of the EASA system to cover air traffic management and air navigation services, the Agency is of course fully aware that the Single European Sky (SES) framework has already established Community competence in this field and has indeed conducted a lot of important and valuable work, not only directly related to safety, but also on economic regulation and rationalisation of service provision. It is hence obvious that this further step in complementing the EU aviation safety regulatory system cannot be implemented without proper coordination with SES. Without pre-empting the results of this NPA consultation, it is obvious that the regulatory means to be considered as the implementation means in this task must be coherent with all other rules in the legal order of the Community, including SES.
15. It would also be unacceptable that investments made in the SES framework so far by the regulated persons, such as air navigation services providers and national supervisory authorities, would not be fully utilised. This same principle naturally embraces the Eurocontrol Safety Regulatory Requirements (ESARRs), which have already been largely transposed into EU law. The ESARRs will naturally continue to be considered as important sources when developing future implementation means for the safety regulation of ATM/ANS. Conversely, it will be necessary to make adjustments to the SES framework so as to avoid overlaps and confused responsibilities; this may imply that some SES regulations and their implementing rules be modified or repealed when the corresponding measures under the EASA system are adopted.
16. The Agency also acknowledges that a fairly broad political consensus seems to exist on the need to further streamline the institutional structures for regulating aviation in Europe. This is demonstrated for example by the final report<sup>4</sup> of the High Level Group (HLG), established by the Commission to give advice on the future of the European Aviation Regulatory Framework. Also the HLG saw the total system approach as the cornerstone of that framework and recommended that safety regulation should be conducted independently from other forms of regulation and that all safety regulatory activities should be dealt with under the EASA system. Very importantly also, the Agency

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<sup>4</sup> [http://ec.europa.eu/transport/air\\_portal/hlg/doc/2007\\_07\\_03\\_hlg\\_final\\_report\\_en.pdf](http://ec.europa.eu/transport/air_portal/hlg/doc/2007_07_03_hlg_final_report_en.pdf)

has observed that the HLG gave strong recommendations on the application of the Better Regulation agenda<sup>5</sup> in the future regulatory framework. The scheme of the better regulation contains principles such as; proportionality, subsidiarity, best allocation of roles and consultation. The Agency is already today fully committed to and governed by these principles. This is well demonstrated, e.g. in the formal rulemaking procedure of the Agency.

17. As a conclusion, it is clear that the regulation of the safety and interoperability of air traffic management and air navigation services in Europe has to be placed under the EASA system. The objective of this document is to seek the opinion of all parties on ways and means to do so, so that the Agency can make its decision in full knowledge of the situation and guide the debates of the Community legislator.

#### **Description of the EASA system:**

18. EASA is a Community Agency and so its foundation is based on the legal framework of the European Communities. This framework establishes that the Community acts as a legislator, while Member States apply Community law under Community control. Community legislator consists of the Council of the EU Member States and of the European Parliament acting in cooperation through the legislative co-decision procedure. Community law is directly applicable in Member States and hence supersedes respective national laws. Where Community competence has been established, Member States may no longer act individually, but may be given powers to deviate or grant exemptions, subject to Community control. The Community framework allows conferring legislative powers to the Commission (hard law) and to an Agency (soft law) or industry, subject to clearly specifying the nature of the delegated powers so as to allow political and judicial control of their exercise. The legislator may also transfer implementing powers to an Agency or industry, when centralised action has been found the most beneficial option to achieve the objectives of the Community. This has taken place most typically in cases such as assessment of conformity.
19. The EASA system was created by adopting the Basic Regulation. This Regulation sets up the European safety regulatory framework; it lays down basic principles for regulating the given field of aviation and establishes EASA as an independent safety regulator with clearly specified tasks and powers, which do not overlap those of national administrations, also involved in the implementation of Community law. That regulation also sets the basis for association of any non-EU European State, which concludes with the Community an agreement whereby it accepts to implement it and to recognise the role and powers of the Agency. On this basis, a number of states<sup>6</sup> are already participating in a truly Pan-European system for regulating aviation safety.
20. The purpose of the basic principles mentioned above is firstly to specify, with sufficient detail and clarity, the safety objectives laid down by the legislator. They shall be produced following a structured risk assessment process, resulting in mitigation measures, which are called "essential requirements". Secondly the basic principles define the scope of the Regulation in order to identify those regulated persons (legal or natural) whose rights are affected by imposing an obligation for them to comply with the defined safety objectives. Thirdly, these principles specify how compliance with the safety objectives is to be implemented and verified, including means for demonstrating such

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<sup>5</sup> A strategic review of better regulation in the European Union, COM(2006) 690 final, 14 November 2006

<sup>6</sup> These states include: Switzerland through the EC/Switzerland agreement on civil aviation; Norway, Iceland and Liechtenstein through the European Economic Area Agreement; and ten Balkan states through the European Civil Aviation Agreement.

compliance. In those areas, where basic principles are complex to implement or uniform implementation is necessary, legislative powers have been delegated to the Commission to adopt legislation (implementing rules) facilitating compliance showing by the regulated persons.

21. The Basic Regulation also mandates the Agency to prepare the implementing rules to be adopted by the Commission and to issue explanatory material to facilitate their understanding and support their uniform implementation, such as certification specifications and acceptable means of compliance (AMC). This is the basis for the rulemaking activity of the Agency.
22. It is obvious that a safety regulatory system could not function satisfactorily without appropriate subsidiarity and local presence, therefore the EASA system has been built on the principle that enforcement is primarily the role of competent authorities nominated at national level. As a starting point it is their task to oversee and facilitate the implementation of common rules, issue individual certificates, grant exemptions and trigger enforcement measures. In this context the Basic Regulation requires the Agency to assist the Commission in monitoring that the Member States implement safety rules effectively and uniformly. It is thus empowered to conduct standardisation inspection of national competent authorities and to report cases of incorrect implementation to the Commission, which can then trigger infringement procedures under the Treaty as appropriate.
23. While the bulk of implementation tasks is performed at national level, the legislator considered, when adopting the Basic Regulation, that centralised action would be the most appropriate means to provide for uniformity when it comes to the approval of the design of aeronautical products and of organisations located outside of the EU. The Agency has been given executive powers to issue type certificates to all aircraft, and the parts fitted thereon, designed in the Community or used by Community operators. It also approves organisation involved in their design, as well as foreign organisation involved in their manufacture or maintenance.
24. The main objective of the EASA system is to establish and maintain a high uniform level of aviation safety. In addition to this the Basic Regulation lays down other objectives. One of these objectives is to facilitate the free movement of goods, persons and services. Indeed article 8 of the Basic Regulation establishes the principle of automatic recognition without further showing or control of certificates issued in accordance with the Regulation and its implementing rules. The EASA system also ensures harmonisation with third countries through international cooperation. This may take place by means of association agreements or mutual recognition of approvals and certificates, supported by regulatory and technical co-operation.
25. Based on what has been explained in this chapter, it can be concluded that the extension of the EASA system implies that new essential requirements, as legislative safety objectives, have to be defined and attached as a new annex to the Basic Regulation. Following this, the regulation needs to be complemented to specify those organisations and persons subject to an obligation to comply with such safety objectives. Furthermore, the Basic Regulation must define how these regulated persons must implement these obligations and how compliance with relevant requirements is to be verified, and by whom. It is also to be noted in this context that all generic provisions already established in the Basic Regulation will, by definition, apply to the areas subject to such an extension.

#### **Safety objectives:**

26. Currently the safety objectives to be met by regulating air traffic management and air navigation services in Europe are set by a combination of the applicable provisions of the basic acts adopted by Member States to establish the regulatory framework applicable to

civil aviation, the International Civil Aviation Organisation (ICAO) Standards and Recommended Practices (SARPs), the SES regulations and Eurocontrol ESARRs. This provides for a blurred image of the safety objectives and does not allow identifying clearly the responsibilities of airspace users and persons involved in the provision of the service needed to mitigate the risks related to air navigation. In most cases national basic acts are indeed about the delegation of executive powers to governmental bodies or to independent civil aviation authorities. They include very little about the result expected by the legislator. They thus leave a large discretion for the executive level to implement the ICAO framework, and set the safety objectives, subject to political pressure, to avoid the occurrence and recurrence of accidents. As the Community is not a contracting party to the Chicago Convention, ICAO SARPs are not part of Community law, although they bind its Member States and also create certain obligations on the Community as laid down in the Basic Regulation.

27. ICAO SARPs on their side do not provide for a convenient basis to set clear safety objectives; they are usually regarded as minimum standards, which may not provide for the level of safety required by European citizens; this is confirmed by the significant number of differences with the SARPs notified by Member States. Moreover ICAO SARPs combine altogether basic principles, essential requirements and implementation means of technical or administrative nature. This structure makes it difficult to differentiate requirements that affect the fundamental freedoms of persons, which should be adopted at legislative level, from implementing rules that are for the executive level to decide, or from requirements of detailed technical nature, which should be covered by acceptable means of compliance or by industry standards.
28. Progress has been made as regards ATM/ANS regulation by the adoption of the SES package and its implementing measures. It must however be recognised that SES regulations have a much wider scope than safety; they are based on the broad objective to provide for sufficient capacity and performance of the European ATM system. It can also be acknowledged that they do not provide for structured and unambiguous safety objectives at the level of basic law. Although specific essential requirements are provided in the SES interoperability regulation, they are limited just to the technical part of the European ATM network and are justified by a broader objective of technical interoperability – safety being only one of its 7 general requirement areas. Moreover, safety regulatory provisions established by SES regulations, even when based on sound rules such as the ESARRs, are fairly scattered and do not connect with the safety regulatory structures in the other fields of aviation, and do not therefore support the total system approach, recognised by all as the best means to avoid safety gaps and reduce the regulatory burden on regulated persons.
29. Fully concurring with the recommendations of the High Level Group, stating that safety regulation should be conducted independently from other forms of regulation to avoid conflicts of interest, the Agency considers that specific safety objectives for the regulation of ATM/ANS must be set up by the legislator, as this is being done for all other domains of the civil aviation system.
30. When considering the most appropriate ways and means to set safety objectives, it has to be acknowledged that the jurisprudence of the European Court of Justice requires Community law to be drafted in a way that allows political and judicial control of the exercise of executive powers by Member States, the Commission or a Community Agency. This in turn imposes that the law specifies the objectives to be met by Community action with sufficient detail and clarity. The Basic Regulation must therefore contain the criteria against which such controls can be made, i.e. to define the safety objectives laid down by law. These safety objectives are called essential requirements. In practise the essential requirements have to be sufficiently generic since they apply to all persons subject to common rules and can only be modified by amending the respective law through the lengthy legislative co-decision procedure of the Community. On the other



hand, they must be sufficiently specific to allow proper judicial control by the Court of Justice.

31. These conflicting objectives could be met by mandating quantitative safety targets. However, neither the Agency nor ICAO believes this would be the right approach in this field. The amount and quality of data available do not provide for the setting of such quantitative targets, especially as regards services provided for in different environments with varying complexity. The same difficulty applies to allocating appropriate quantitative targets to different parts of the complex chain of ATM/ANS, taking into account in particular the influence of human factors in that chain. It is also doubtful that the legislator would be prepared to quantify aviation safety by setting acceptable probabilities for accidents to happen. The Agency is fully aware of ICAO recommendations and guidance on defining acceptable levels of safety, but does not believe that this can be interpreted as requiring that such levels be quantified.
32. In this context the Agency has worked on defining essential requirements as the set of means to be implemented to mitigate unacceptable risks linked with air navigation, gate to gate. Such means mainly aim at minimising, as much as possible, the risk of collision between aircraft and between aircraft and the ground. They also encompass the risks related to possible lacks of interoperability. As aviation is by essence of a global nature and aircraft fly from place to place, the rules devised to provide for the necessary level of safety also have to be harmonised regionally or worldwide. The Agency considers therefore that interoperability cannot be dissociated from safety when regulating civil aviation and essential requirements must consequently also cover the related risks. It recognises nevertheless that other aspects of interoperability, such as interconnection of constituents and systems, may be regulated for other reasons than safety and should therefore be subject to the appropriate requirements set by the competent bodies.
33. As Member States are bound by their ICAO obligations, care has been taken to ensure that the envisaged essential requirements comply with SARPs. Since also the SES framework and Eurocontrol standards have been recently implemented, the transfer of safety regulation under the EASA system shall not create disruption; care has therefore been taken to ensure that the essential requirements would allow the continued use of the existing implementation measures of the SES, in particular ESARRs. The process followed is explained in Section B of this document, as well as the link between the resulting requirements and existing ICAO SARPs.

#### Concept of operations

34. When undertaking this exercise, the Agency met with a conceptual difficulty. As air traffic management has for prime objective to reduce the risk of collision between aircraft through a combination of rules/procedures imposed on, and services to be provided to, airspace users, it seemed reasonable to require that such a combination, called thereafter the concept of operations, be checked to verify that it provides for the expected risk mitigation. A basic principle of regulation however is that requirements are imposed on individual natural or legal persons and that decisions attesting compliance thereof create rights and obligations for their addressees. Setting in law essential requirements applicable to the concept of operations requires therefore that persons responsible for such concepts of operations are identified. It is however unclear to the Agency whether such concepts are currently decided by governments, individually or collectively, or by air traffic control service providers. The envisaged legislative action provides an opportunity to clarify the situation.
35. A concept of operations is a combination of rules, procedures and services that may range from simple "rules of the air" in very low density airspace to very complex combinations of procedures (route networks for example) and air navigation services (including the whole range of ATM/ANS functions) in high density airspace. The objectives

to be met by a concept of operations include not only safety, but also economic efficiency, environmental protection and any other criteria that a legislator can set to satisfy public expectations. There is a more or less explicit concept of operations underpinning the use of any piece of airspace. Current coordination practices to ensure a consistent network are organised at government level, using ICAO, EUROCONTROL or SES mechanisms; implementation of the concept is partially made by imposing enforceable regulations on airspace users (generally using operational rules issued by safety regulators); other elements of the concept are now implemented in the SES by regulations imposed on service providers. Therefore, at first sight, the adoption of the concept of operations resembles very much a governmental act. If such is the case, it is not possible to include essential requirement in the Basic Regulation applicable to the concept of operations, as the legislator cannot regulate itself. It can commit to using such criteria, when shaping its decision, but cannot impose them on itself by law.

36. An alternative would be to consider that the monopoly air traffic control service provider is responsible for deciding on the applicable concepts of operations in the airspace under its control. This would allow identifying the persons who have to demonstrate compliance with essential requirements related to the concept of operations. This would however present several drawbacks. First, it only works as long as collision avoidance is a natural monopoly; this could also affect possible developments towards future air navigation systems based on alternative concepts of operations less dependent of air traffic control. Second, it implies that the monopoly service provider regulates its users and other providers of un-bundled air navigation services; this would not be actually compatible with one of the basic principles of the SES regulations, i.e. to require clear separation between service provision and regulatory functions.

*QUESTION 1: The Agency is interested to know whether stakeholders consider that deciding on the concepts of operations is a governmental function or that of air traffic control service providers.*

37. To conclude, and without prejudice to the conclusion of the debate referred to above, the Agency is proposing to enshrine in the extended Basic Regulation the essential requirements, which must be met through the regulation of ATM/ANS. This is the model, which has been chosen in all other areas of aviation safety regulation. It has therefore developed the draft essential requirements in Section B II of this document.

*QUESTION 2: The Agency is interested to know whether stakeholders consider the attached essential requirements as constituting a good basis for the regulation of the safety and interoperability of ATM/ANS. It also welcomes any suggestion to improve these essential requirements.*

## **Scope and applicability:**

### General

38. According to the legal system establishing the European Community, the scope of common action transferring powers to the Community institutions has to be precisely specified. The Basic Regulation shall therefore define which natural or legal persons are required to comply with the essential requirements. It shall also identify those aspects related to ATM/ANS, which are to be regulated at Community level through the EASA system, as well as the volume of airspace in which Community law will apply. As a consequence of this, these activities will be subject to the requirements established by this regulation and, as appropriate, to rules taken for its implementation. In those areas where Community competence has been exercised, Member States will no longer be entitled to impose their own standards. Conversely, activities which will not be covered

by Community competence will remain under the full responsibility of Member States, which should take appropriate measures to provide for the level of protection expected by their citizens.

#### Airspace

39. As introduced above, it is necessary to define the airspace in which common rules will apply. The SES regulations have already established Community competence in the aggregated volume of airspace, in which Member States are providing air traffic services. According to ICAO Annex 11, this includes the airspace under their jurisdiction, as well as over the high seas, or of undetermined sovereignty, in which they have accepted to provide such services. These volumes of airspace are traditionally called Flight Information Regions (FIR) and Upper Flight Information Regions (UIR) in cases, where the responsibility for the provision of ATS services has been shared in vertical dimension. ICAO Annex 11 states that the FIR should be delineated to cover the whole of the air route structure to be served, but does not define directly their upper limit. Although some Member States have defined the upper limit of their respective FIR (or UIR), based mainly on practical considerations of the needs of airspace users, it can be assumed that such limits will evolve with technological progress, so as to meet the needs of new types of aircraft or space shuttles. The Agency therefore assumes that the scope of the EASA system in the field of ATM/ANS should at least cover the same airspace.
40. Based on its analysis of the ATM/ANS related safety risks, and taking into account that general aviation is already regulated under the EASA system, the Agency also considers necessary, in order to be consistent with the total system approach, that the currently un-controlled airspace be subject to Community competence. Safety risks, such as those related to the lack of, or non-compliance with, common rules of the air and the need to accommodate all categories of airspace users, as well as future needs, require that the total airspace used for any civil aircraft be included in the scope of this extension of the Basic Regulation. This airspace should naturally be regarded to contain all interactions needed over its external borders with adjacent airspaces.

#### Airspace users

41. The implementation of concept of operations requires that appropriate rules and procedures are imposed and that certain critical ATM/ANS services are provided, consistent with the density and complexity of the airspace at stake. All users of such airspace must then be required to comply with these rules and procedures and to make use of the mandated air traffic management and air navigation services. In the same way they would be obliged to meet the equipment and training requirements necessary to comply with these rules and procedures, as well as to get access to, and use, the mandatory services. All airspace users must therefore be subject to the common rules adopted under the EASA system for regulating the safety of ATM/ANS.

#### Service providers

42. As stated above, the implementation of concept of operations also requires in most cases that appropriate air traffic management and air navigation services be provided to airspace users. The Basic Regulation has to define the services in ATM/ANS, which shall be subject to common safety requirements. Analysis of aviation safety data indeed clearly shows that most of such services are of significant safety relevance for air traffic and the Member States have already agreed, through the SES regulations, that common rules at EU level on ANS service provision must be established. Therefore, the provision of ANS services shall be included in the scope of the extended Basic Regulation as regulated services. As defined in EU legislation, such services include air traffic management (ATM), which itself is an aggregation of air traffic services (ATS), air space management (ASM) and air traffic flow management (ATFM), containing air and ground functions required to

ensure the safe and efficient movement of aircraft during all phases of flight and air navigation services (ANS), which include communication (COM), navigation (NAV) and surveillance (SUR) services; meteorological services (MET) for air navigation and aeronautical information services (AIS). Essential requirements have therefore been established to allow verifying that such services are provided in a way that allows implementing the concept of operations.

43. As explained here above in paragraph 34, regulation can only apply to natural or legal persons. The regulation of the above services must therefore be accomplished by requiring their providers to comply with the related essential requirements. While this is relatively straight forward for most providers, which are already subject to the SES regulations, the situation is not totally clear from a regulatory point of view when it comes to ASM and ATFM. The SES package, although containing these functions in its scope, does not establish common (or essential) requirements for their provision nor impose any obligation for their certification. It is indeed questionable whether such functions are service provision or regulatory actions.
44. Building again on the definitions in the SES regulations, ASM means a planning and operational function, whose aim is primarily to allocate airspace to its various users on the basis of their needs and to maximise its utilisation by dynamic time-sharing, taking into account short-term needs. ASM must provide for sufficiently precise and current information on the planned and actual use of defined volumes of airspace or on the availability of conditional routes to general air traffic. Furthermore, ASM must ensure effective coordination and timely exchange of accurate information between relevant ATC units, as well as with airspace users. As such, ASM clearly contains tasks, which may potentially cause critical safety risks. The allocation of scarce resources is however a regulatory function, as it implies the exercise of powers on the regulated persons, which is traditionally exercised by public entities in order to ensure neutrality and avoid possible conflicts of interests. Such is the case as regards strategic aspects of ASM, but tactical management seems to have been progressively handed over to service providers. Consequently, before deciding whether ASM service providers have to comply with the essential requirements, it is to be decided whether they are regulatory bodies or service providers, as regulatory bodies cannot be regulated.
45. As regards ATFM, its principal objective is to adjust users' demand to ATC capacity by forbidding users to take-off or to use the route of their choice to prevent overloading portions of airspace or aerodrome capacity beyond safe limits. As such it is clearly a safety function. Technological and operational evolution lead by SESAR might however extend the range of ATFM to adjusting offer to demand by giving it powers to require air traffic control service providers to increase capacity as necessary to meet traffic demand. As such this function presents many aspects of a regulatory function, close to the management of scarce resources. For the reasons explained here above, it is therefore questionable whether ATFM is really service provision or a regulatory task and whether it can be allocated to regulated persons.
46. Based on above considerations, the Agency considers that all organisations involved in the provision of air traffic management and air navigation services, as listed in the essential requirements, shall be subject to the extended Basis Regulation, except those only involved in airspace management and air traffic flow management. As regards these functions, and before issuing its formal Opinion, the Agency would like to know the views of stakeholders in this subject.

<p><i>QUESTION 3: The Agency is interested to know whether stakeholders consider that ASM and ATFM are of a regulatory or service provision nature.</i></p>
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## Systems and constituents

47. When considering the scope of Community action, there is a need to clarify also what systems – such as air traffic control centres or radar stations, and constituents - either on aircraft, on the ground or in space, in the complex technical infrastructure of ATM/ANS will be affected. These elements altogether contribute to providing a service that must be safe. If the safety objective imposes restrictions on the design, production, maintenance or operation of any of these elements, such restrictions must be clearly specified by the legislator. When so decided, such systems and constituents may only be operated by their owners/operators or put on the market by their manufacturers, if compliance with the essential requirements can be demonstrated.
48. Currently the SES regulations establish Community competence for the European air traffic management network (EATMN), so as to provide for the interoperability of its systems, constituents and associated operating procedures. The EATMN has been defined to mean a collection of systems enabling air navigation services in the Community to be provided, including their interfaces and boundaries with third countries. This does not however imply that they all are of such a critical nature for safety that they have to be subject to the attached essential requirements. It might be therefore appropriate to clarify further what systems and constituents actually need to be regulated in the context of the extended Basic Regulation. The Agency would therefore be grateful to know stakeholders views on this issue.
49. Furthermore, it should be noted here that the broad definition in SES framework of the European ATM network overlaps already with the remits of the EASA system as regards equipment on board the aircraft used for air navigation purposes. Such equipment is already regulated through the Basic Regulation, which requires it not only to meet the airworthiness requirements, but also to be fit for purpose. This is verified by the EASA certification process. A similar situation will exist for some aerodrome equipment, which is covered by the essential requirements for aerodrome safety, when it is safety critical for take-off and landing. While such an ambiguity does not in itself create difficulties, if it does not lead to loop-holes in the system, care needs to be taken when developing implementing rules that common regulatory processes are implemented to verify compliance so as to reduce the administrative burden on regulated persons.

*QUESTION 4: The Agency is interested to know whether stakeholders consider that the definition of systems and components used in the context of the European Air Traffic Management Network appropriately specifies those, which need to be subject to the extended Basic Regulation?*

## Personnel

50. Member States have already accepted through their ICAO commitments and then subsequently under SES regulations that air traffic controllers<sup>7</sup> must be subject to common requirements on theoretical knowledge, practical skill, language proficiency and medical fitness. This is naturally also the starting point for the Agency to consider these personnel as a regulated profession.
51. The legislator must also specify whether other personnel involved in ATM/ANS service provision should be required to comply with essential safety requirements. Such requirements may aim at ensuring, not only that staff has undergone the necessary training, which is a requirement for all professions, but also that it meets appropriate physical/medical fitness and sufficient current practice. In such cases, the related tasks

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<sup>7</sup> Directive 2006/23 on a Community air traffic controller licence

can only be executed by persons complying with such requirements. The need to meet such requirements, which limit the freedom of those individuals to exercise this profession of their choice and can even force them out of their employment when they do not meet them anymore, should be established by the basic law rather than secondary executive acts or industry practices.

52. When developing its essential requirements, the Agency has not identified such a need for any other personnel than air traffic controllers. It has however noted that service providers must ensure that other staff assigned to specific safety sensitive functions are properly trained. The Agency is therefore of the view that the extended Basic Regulation should identify only air traffic controllers as persons required to comply directly with the relevant essential requirements.

### Organisations

53. The Basic Regulation shall also specify which organisations, other than those involved in the provision of air traffic management and air navigation services, must be subject to essential safety requirements. When developing such requirements, the Agency has identified so far only the organisations involved in the training of air traffic controllers. This reflects also what has already been decided when adopting the above mentioned directive on the European air traffic controller licence.
54. Currently organisations involved in the design, manufacture and maintenance of aircraft and their components are required to comply with specific essential safety requirements, so that they can take responsibility for the tasks they execute. This allows them in particular to verify and attest compliance of their products or work with the applicable regulations. This of course then relieves the responsibility of users of their products, who may not have proper means to exercise such a responsibility for very complex products or systems. As mentioned in the paragraph 49, it will be necessary to issue implementation rules that reduce burden on regulated persons; some harmonisation between the various regulatory systems may be useful therefore.
55. Moreover, the current process established by the SES interoperability regulation presents some features that could be improved. It requires in particular service providers to be responsible for the systems and constituents they use, while they may have difficulties to build the necessary expertise to do so; in such cases they may call for the support of notified bodies but common requirements for the accreditation of such bodies should be defined. Constituents' manufacturers are required to attest the conformity of their products, but no condition is put on them to ensure that such attestation can be trusted. The Agency considers therefore that it may be appropriate to examine whether requirements similar to those imposed on aeronautical manufacturers and maintenance organisation could be imposed on organisations involved in the development, manufacture and maintenance of safety critical ANS systems and constituents

*QUESTION 5: The Agency is interested to know whether stakeholders consider that regulating organisation involved in the design, manufacture and maintenance of safety critical systems and constituents, as well as those involved in the verification of conformity, should be required to demonstrate their capability so as to alleviate the responsibility of their operators?*

### **Implementation means:**

#### General

56. As presented here above in the description of the EASA system, the Basic Regulation has also to specify how compliance with the essential requirements is to be demonstrated.

This includes specifying whether issuing an official certificate, showing to a third party or self-declaration should be used to demonstrate compliance. It also requires that details are provided on how such demonstration of compliance should be made. If such details are too complex or lengthy, executive powers should be given to the Commission to develop the necessary implementing rules. When appropriate, the bodies in charge with the issuing of the certificate, or to which compliance is to be shown, should be identified. While it is generally for the Member States to oversee compliance with the Basic Regulation and its implementing rules through their competent authorities, the legislator can in some cases delegate such tasks to the Agency itself or appropriately accredited entities. In the last case, criteria for accreditation would need to be specified and accreditation authorities nominated.

57. There is a wide range of possibilities to verify compliance with the common safety objectives. The choice of which to use is a political decision, which depends on public sensitivity to the subject. The issue of a certificate by official bodies may be perceived as providing better proof of compliance than showing to a private third party, which itself can be seen as a more powerful tool than self-declaration. As far as civil aviation in general is concerned, several of these forms of regulation have been used in different Member States in different sectors.
58. The choice on how to verify compliance also depends on the level of uniformity that is sought for a certain type of activity. While uniformity can be essential to facilitate the free movement of goods, services and persons, it may not be a necessary condition for all types of activities. Also, the implementation means decided by the Community should be compatible with the international obligations of Member States so as not to unduly affect the business of European citizens and companies with the rest of the world or affect the global nature of civil aviation.
59. The purpose of this chapter is to examine best options to implement the essential requirements in the domain of ATM/ANS so as to give proper advice to the legislator.

#### Airspace users

60. Airspace users will be required to follow dedicated rules and procedures to implement the concept of operations in the airspace they use; they also have to carry the appropriate equipment and use the mandated services for that piece of airspace. The high level of the related essential requirements certainly does not allow the users to know exactly what they have to do. It is necessary therefore that detailed implementing rules be adopted.
61. The soon to be adopted extended Basic Regulation already establishes a basis for imposing requirements for airspace use on all air operators, whether they are EU citizens or not. Consistent with ICAO Annex VI, such rules are indeed generally imposed through operational rules adopted by the State of registry or of operator to reflect the concepts of operations adopted by the other Contracting States. It has also been decided by the legislator that foreign operators will have to comply with Community requirements when in the airspace of Member States; this gives an opportunity to impose on them the necessary rules to comply with airspace requirements. In the EASA system these rules will be adopted by the Commission on the proposal of the Agency.
62. If the rules, which are currently being developed, appear not to be sufficient, they would have to be complemented on a case-by-case basis. It might moreover be necessary to clarify in there those areas of subsidiarity, where Member States may have to develop additional rules to address local peculiarities. In such case, they would be entitled to issue their own local prescriptions, subject to Community control to verify consistency with the overall concept of operations.

63. Verification of compliance with the above rules is made through a certification process (issue of a certificate or an attestation) only for commercial operators. This may be insufficient as regards compliance with ATM/ANS requirements that have to be met by non commercial operators, such as for example the carriage of the necessary equipment for Reduced Vertical Separation Minimum and the ability of the crew to operate in such an environment. Additional certification requirement will therefore need to be included in this additional extension of the Basic Regulation.
64. The competent authorities for implementing the operational rules are the National Aviation Authorities as regards operators residing<sup>8</sup> in their territory and the Agency for the foreigners. For the sake of simplicity and in order to avoid confusions as well as possible loop-holes, the same sharing of roles is certainly the most appropriate for the verification of compliance with the additional rules envisaged in the previous paragraph.

#### Service providers

65. Without prejudice to the answers to question 3, service providers will be required to provide services adapted to the concept of operations; they also will have to implement a more or less complex management system, depending of the size and nature of their activities. Important is also the fact that all possible services to be provided are very different in nature and that a single set of requirements is unlikely to fit for each of them, as this is already reflected in the essential requirements themselves. Moreover, the current level of generality of these essential requirements does not allow service providers to exactly know what they have to do to comply. It will therefore be necessary to develop implementing rules adapted to each type of service.
66. To ensure an appropriate level of uniformity, the Agency is of the opinion that such rules should be common and therefore adopted by the Commission on a proposal of the Agency. It may however happen that the concept of operations include pieces of airspace sufficiently independent from the others so that, consistent with the principle of subsidiarity, the issuing of local rules would be the most appropriate means. Similarly local circumstances may justify local adaptation to the concept of operations agreed at Community level. The Agency considers therefore that the implementing rules adopted at Community level should include areas of subsidiarity where Member States will be entitled to issue local prescriptions, subject to Community control to verify consistency with the overall concept of operations. In all cases of course, such rules will have to be developed taking into account the necessary continuity and coherence with related SES regulations and implementing rules.
67. Taking into account public sensitivities and policies established in the SES, the Agency fully conceives that the ATM/ANS service provision in the Community shall continue to be subject to certification schemes. It is a fact indeed that such service providers have been, or are being, issued a certificate by National Supervisory Authorities. It is questionable however whether all services provided so far, such as Flight Information, are so safety critical that their provision justifies imposing a fully fledged certification process to verify compliance with the applicable implementing rules? The EASA system accepts indeed that in some cases regulated persons are only required to comply and that compliance is only ensured by enforcement, supplemented eventually by self-declaration. In such case failure to comply involves full personal liability and may be punished by penal sanctions.

*QUESTION 6: The Agency is interested to know whether stakeholders consider that the provisions of certain services should not be subject to certification. In such case, what would be these services?*

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<sup>8</sup> In this context residing shall be understood as meaning the normal residence for a natural person or the principal place of business for a legal person.



68. In the EASA system it is current practice that organisations are certified only once for the management of all the products they manufacture or services they provide when they do so under a single centralised management system. Air operator are entitled to operate several aircraft when it has been recognised fit and able to do so; what they are exactly entitled to do is described in their approved operations manual. Similarly a maintenance organisation can maintain several types of aircraft in various workshops located in different countries under a single certificate; this again is described in their approval. The Agency considers that such options should also be envisaged for ATM/ANS service providers so that they do not need to hold a certificate for each service they provide or each facility they operate. This would not change their obligation to develop and keep up-to-date management and operations manuals covering all the services they provide and of course the types of allowed services would be explicitly listed in their certificate. This would facilitate developments in the sector by avoiding unnecessary multiplication of certifications for the same organisation and promote international business and competition in providing these services.

*QUESTION 7: The Agency would be interested to know stakeholders views as regards the possibility for ATM/ANS service providers to be entitled to operate several services and/or operating units under a single certificate.*

69. To be consistent with the principles underpinning the EASA system, the competent authorities responsible for issuing the above mentioned certificates should be the National Authorities as regards operators residing in their territory and the Agency for the foreign organisations providing services in the European airspace. If the debate launched by question 1 above were to lead to including the approval of the concept of operations under the approval of air traffic control service providers, the Agency considers then that for the sake of coherence of the whole pan-European ATM system, it should be involved in such an approval; to do so the competent authority should submit the envisaged concept of operations to the Agency for prior approval.
70. However, as explained in paragraph 23, the legislator can decide that some certification tasks can be better executed centrally for reasons of uniformity or of efficiency, in particular in domains requiring a rare expertise. This might be the case for ATM/ANS services of a true pan-European nature. Typically in such cases the service concerned is un-bundled from air traffic services and is, in many cases, of an economic nature justifying application at least of the principles of a contestable market. This could make it questionable to require the Member State in which the service provider has its principal place of business to be in the lead of the certification process. Also the issue of appropriate resources (human resources and experience) needed in such a large-scale certification operation could make it very difficult for the Member States to execute the related certification tasks. Based on this, and on the legal objective laid down in the Basic regulation to promote cost-efficiency in the regulatory and certification processes and to avoid duplication at national and European level, it might be appropriate to consider giving the Agency responsibility to certify large pan-European ANS/ATM service providers. The independence of the Agency guaranteed by law, as well as the experience it has gathered in large scale certification of aircraft, would strongly support this development.

*QUESTION 8: The Agency would be interested to know whether stakeholders consider appropriate to require the Agency to certify pan-European ANS/ATM service providers. In such a case what should be the criteria to define the pan-European nature of the service?*

71. The EASA system provides for some certification tasks to be delegated to “non-public” persons. Such persons are called “assessment bodies”. This may allow in particular non safety critical functions, such as flight information to be under the oversight of trade associations or federations. If this were decided, such bodies would have to be accredited to verify that they have the necessary resources and processes to exercise such tasks

with the necessary expertise and independence. Criteria for accreditation are already included in the Basic Regulation as Annex V. Such accreditations could be performed by the competent authority of the country of residence. To avoid possible conflicts of interest, it would be reasonable if the Agency could also accomplish accreditations.

*QUESTION 9: The Agency is interested to know whether stakeholders consider that the certification of some service providers involved in less sensitive services could be performed by assessment bodies. In such a case, should the Agency also be also empowered for the accreditation of such assessment bodies?*

#### Systems and constituents

72. In the previous chapter it was concluded that safety critical systems and constituents should be subject to regulation. Without prejudice of what such critical systems and constituents are, it must be examined how compliance with the essential requirements will be verified. In view of the potential variety of such systems and constituents, as well as the high level of the applicable essential requirements, it seems necessary to adopt implementing rules so as to put regulated persons in a position to clearly know what they have to do to comply. These rules should be adopted by the Commission as common rules to ensure the proper uniformity and facilitate the functioning of the internal market. Such rules will have to be complemented as appropriate by industry standards and Agency certification specifications to further facilitate implementation.
73. Considering the needs to facilitate the development of new emerging technologies in this field, it seems obvious that such rules should be developed mainly on a case-by-case basis and should take into account a proper balance of binding rules and voluntary standards as is introduced for example by the Community new approach in the regulation of technical products. This would provide the necessary flexibility for the industry to develop and utilise new technologies and best practices in their production. As also explained previously such rules and standards should fully take into account already adopted measures for the implementation of the SES so as to provide for continuity of requirements and processes. They need to be proportionate to their purpose and ensure synergy with already existing rules to avoid overlapping or duplication of certification processes
74. As regards certification, the legal framework established under the SES Regulations, imposes a system for conformity assessment of the EATMN systems and constituents. In this system putting onto a market an identified constituent assumes that its manufacturer ensures the compliance with the essential requirements and relevant implementing rules by issuing an EC declaration of conformity or suitability for use, once the constituent is delivered. In case of EATMN systems it is required that, after their integration on the site, the verification of compliance is declared by the certified service providers themselves on the basis of a technical file containing, when required by the applicable implementing rules, also a certification issued by a notified body.
75. The Agency sees no reason not to continue with that system. It is however open to suggestions for improvement where feasible. This could in particular cover separate certification schemes, as is being done in the field of airworthiness, for significant systems and constituents for which the service provider does not have sufficient expertise or for which a different sharing of liability between the operator and the manufacturer has to be organised to reduce insurance costs.

*QUESTION 10: The Agency would be interested to know whether stakeholders consider appropriate to implement separate certification schemes for certain safety critical systems and constituents. If so what should be these systems and constituents?*

## Personnel

76. As already stated in the paragraph 50 of this document, it has been agreed by law that air traffic controllers must hold a license and appropriate ratings attesting compliance with safety provisions. A directive has already been adopted to this effect. To be consistent with the EASA system, such a directive should be transferred in the form of a Commission regulation, so that it can be adjusted at executive level to avoid lengthy legislative processes. It is clear therefore that powers need to be given to the Commission to develop appropriate implementing rules in this field.
77. When it comes to the issuing of the licences, the Agency agrees that the best option is to continue the proven concept of competent authorities nominated at national level being assigned to these tasks, as provided for in the said Community Directive or in all other EASA implementing rules adopted for similar purposes.
78. As regards other personnel involved in the provision of ATM/ANS services, paragraph 52 concludes that service providers must ensure that staff assigned to some safety sensitive functions is properly trained. This certainly will require proper implementing rules. Such rules however will be part of the conditions for the certification of the service provider itself. The Agency sees therefore no reason to foresee dedicated implementing rules for other categories of staff than air traffic controllers; it is however open to suggestions that it will duly take into account when formulating its final opinion.

## Organisations

79. It is already established by law that an organisation involved in the training of air traffic controllers must be certified. The related conditions are included in the Directive. For the same reasons as those explained here above, it would be appropriate that such requirements are transferred to EASA implementing rules and that the related powers be given to the Commission. When developing such rules, the Agency thinks it might be possible to consider that such certification should give privileges to these organisations to organise examinations themselves and to issue attestations of compliance on the basis of which licences can be issued by the competent authorities, as this is currently the case for maintenance training organisations under the EASA system.
80. Consistent with the EASA system, it is logical that the competent authorities for certifying air traffic controllers' training organisation be that of the State of principal place of business or the Agency, in the case of foreign organisations.
81. As regards now organisations involved in the development, manufacture and maintenance of safety critical ANS systems and constituents, and without prejudice to the final decision on question 5, it is evident that any certification scheme should be supported by common implementing rules adopted by the Commission to support the free movement of products and services. Competent authorities for certification would be those territorially competent and the Agency for foreign organisations.

## **V. Regulatory Impact Assessment**

82. According to the formal rulemaking procedure of the Agency a full regulatory impact assessment has to be introduced as a part of any proposed new rule. However, at this very stage the establishment of a regulatory impact assessment in this task has little significance. As has been already explained in the paragraph 12 of this document, the Commission launched a preliminary impact assessment by an independent consultant on best ways and means to establish a Community safety regulatory system into these fields.

This impact assessment concluded clearly that collective action under the auspices of the EASA system is the best option, subject to a careful transition path and an appropriate distribution of certification tasks between the Agency and other competent authorities.

83. The aim of this NPA is to seek advice from stakeholders of how this safety regulatory system should be outlined and what safety objectives should be laid down by the legislator. There are still a number of unknown elements about the exact scope of Community action and the means to regulate ANS/ATM services in the envisaged context. The evaluation of impact is mainly linked to the detailed nature of the requirements themselves and on the scope of the system to be established. Moreover, the decision to establish Community competence in this field has already been taken and is already largely implemented within the SES framework. This limits the task of verifying the impact to those elements which introduce new or changed regulatory means in this field.
84. The Agency intends nevertheless to elaborate on the impact assessment of its proposed actions when it has analysed the views of stakeholders on the present consultation and presents its final opinion to the Commission. Recognising also the prerogative of the Commission to analyse the impacts of the legal proposals it issues, the Agency wishes naturally to elaborate on how useful and beneficial it would be to consolidate these two impact analyses on the same subject matter.

## **B DRAFT ESSENTIAL REQUIREMENTS**

### **I Description of the essential requirements<sup>9</sup>**

#### Introduction

85. As already described in the explanatory note, the Agency will assist the Commission in submitting legislative proposals for the safety and interoperability regulation of air traffic management and air navigation services (ATM/ANS). This implies in particular that safety objectives are specified by the legislator. This description of the essential requirements explains how these requirements have been drafted. It has for main objectives to explain:
- what essential requirements are;
  - the process of hazard mitigation used to draft them;
  - how they enable compliance with ICAO standards and recommended practices.
86. As their name indicates, essential requirements are the conditions to be fulfilled by a service, a product, a person or an organisation to ensure that the public is not unduly affected by their operations or activities. They address therefore the means by which risks associated to a specific activity shall be eliminated or reduced to an acceptable level, when reasonably probable. To achieve this goal, hazards and associated risks have been identified and analysed to determine the requirements that are essential to mitigate unacceptable risks. In that context it must be made clear that certification processes are not mitigating measures; they are the verification that a mitigating measure is being implemented. As far as mitigating measures are concerned, it is also important to insist that they must be proportionate to the safety objective. This means that they must not go beyond what is necessary to achieve the expected safety benefit without creating undue restrictions that are not justified by that objective. To validate the results of such a “top down” approach, a “bottom up” review was made to examine why particular essential requirements were imposed; which risk such requirement was mitigating; and whether the means used were proportionate to the safety objective.
87. In this context, the Agency undertook work to assess safety hazards related to the interaction between aircraft, on the ground and in all phases of flight. The mitigating criteria that were introduced, when the associated risk appeared unacceptable, which constitute the essential requirements, allow compliance with relevant ICAO Annexes, SES regulations and Eurocontrol ESARRs insofar as related to the safety and global interoperability requirements. The resulting essential requirements were structured under logical sections, aiming also to offer, as far as practicable, consistency with the structure and contents of the five other sets of essential requirements provided by the Agency in the other fields of aviation safety regulation. This consistency is one element of the total system approach, aiming to ensure that detailed safety rules in all fields of aviation safety will be developed along similar principles and will cover all planned safety objectives without gaps, being potentially detrimental to the level of safety. The sections of these essential requirements are:
- Hazards related to concept of operations
  - Hazards related to the use of the airspace
  - Hazards related to services
  - Hazards related to systems and constituents

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<sup>9</sup> For information purposes only.

- Hazards related to qualification of air traffic controllers
- Hazards related to service providers and training organisations

88. As specified in the explanatory note, the essential requirements have been drafted with the view to allowing alternative implementation means, which could vary depending on the type of the regulated service, product, person or organisation in question. They create the legal mandate needed for further implementing rules or for direct enforcement. It would be possible therefore, to develop implementing rules building on material already developed in the context of ICAO or SES framework or to introduce other forms of regulation depending on the answers to the questions raised in this document.

#### Mitigation of the hazards related to the concept of operations

89. Concept of operations means the total architecture of any portion of airspace designed for a certain volume and type of air traffic and consisting of underlying services, airspace structures, operating procedures and air navigation systems infrastructure. Every element of such a complex network has to be developed properly as well as focusing enough on the interaction between these elements and on the continuation of operations in all circumstances. The design of a concept of operations has to ensure that no safety risks are caused by characteristics of the traffic or by latent hazards triggered by unexpected events, such as a need to divert all landing traffic from one aerodrome to another via more than one air traffic control service zone. Therefore the paragraph 1.a establishes a requirement to address the design of the concept of operations in any given volume of airspace. These principles are common with ICAO's work to develop a common air navigation plan in its draft Doc 9750.
90. As already stated above it is obvious that the concept of operations has to be designed on the basis of the expected density and nature of traffic and relevant operational concepts caused for example by adverse weather conditions. This is the intent of paragraph 1.b.
91. Building on what already has been explored in two previous paragraphs; there are several aspects, which have to be addressed when designing the concept of operations. Paragraph 1.c therefore gives a non-exhaustive list of such elements.
92. Airspace is a common resource for all categories of users. Its design should be based on operational requirements, however minimising the risk of safety hazards. Airspace design should address all relevant airspace structures, including the network of routes, and based on these define a maximum airspace design capacity in terms of traffic characteristics. This is mandated by the paragraph 1.d.
93. In order to prevent safety risks caused by insufficient service provision capacity, means must be established to ensure that air traffic volumes do not exceed the maximum airspace design capacity. Paragraph 1.e requires establishing this mechanism.
94. As is a common practise in any safety management system, a new design or an amendment to existing design should be implemented only when an assessment of its effects has taken place. Changes to design could be triggered for various reasons such as emerging traffic characteristics, new operating procedures or implementing new systems. A need to validate changes before their implementation is the reason for paragraph 1.f.
95. Aeronautical services can not be provided without sufficient and adequate allocation of electromagnetic spectrum for aeronautical communications. This prerequisite is not only an essential enabler for certain ANS services, but also a critical criterion protecting

aeronautical communications from unacceptable electromagnetic interferences. This generic responsibility to safeguard the frequency planning related to aeronautical communications is the reason for introducing paragraph 1.g.

#### Mitigation of the hazards related to the use of the airspace

96. A starting point for the safe conduct of air traffic in a given airspace is to ensure that operating rules and procedures exist and that all aircraft comply with them. Situations such as, operating a controlled flight without obtaining appropriate air traffic clearances, can adversely affect safe separation from other controlled flights, which could in the worst situation lead to a collision between aircraft. In the ICAO context, Annex 2, which is about rules of the air, but also other Annexes and some other ICAO documents such as PANS ATM (Doc 4444) and PANS Aircraft Operations (Doc 8168), contain various such operating rules and procedures. The purpose here, stated in the paragraph 2.a, is to mandate the compliance with common rules and procedures which are safety critical and which are related to safe interaction between aircraft.
97. Furthermore, a flight should not take place without proper functioning equipment on board the aircraft, including of course those needed for ATM/ANS purposes. The absence or misuse of such equipment could lead to the pilot lacking references in certain meteorological conditions or air traffic control not being able to receive aircraft identity and position information. This could result in the loss of orientation, the loss of control, damage to the aircraft or some of its equipment, or even collision with other aircraft or the ground. Moreover, the growing volumes of air traffic and emerging capacity constraints create needs for new operational concepts, which in most cases require carriage of new ATM/ANS equipment on an aircraft. Technical specifications of ATM/ANS related equipment on board are specified mainly in the ICAO Annexes 6 and 10, but the requirements related to their mandatory carriage by and large in the ICAO Regional Air Navigation agreements. Therefore, point 2.b was developed, to also impose that appropriate equipment in a given airspace is on board and operative.

#### Mitigation of the hazards related to ATM/ANS services

##### *Aeronautical information*

98. ATM services are dependant on the quality and timeliness of the provision of aeronautical information. Incorrect information given to flight crew could create significant safety risks for a flight. Indeed, there have been numerous past incidents mainly caused by such mistakes in the source data of national AIPs for example. Traditionally all aeronautical documentation and information available to flight crew has been in the paper format. Most of this information is now available in electronic format. The importance of high-quality aeronautical information increases significantly by implementing new methods and technologies. Such has been the case with computer based airborne navigation systems and with sharing information via modern data link systems. It is therefore obvious that the quality of information can not be guaranteed without also assuring the data used as a source for it. This is the reason for the development of paragraph 3.a.1. This requirement is in accordance with ICAO Annex 15, but goes further by aiming to cover needs emerging from the rapid development of data based technology and new developing concepts, such as aeronautical information management (AIM).
99. As explained above, aeronautical information has to be based on qualified source data and has to be kept up-to-date. This is however not in itself enough. It's quality has to be maintained in all phases of its provision. This assumes that the aeronautical information has to be processed properly, provided in a format understandable to all flight crews allowing all the relevant details to be found therein. If the user cannot understand the data, it cannot convey the necessary information. This would result in

the same risk as if there were no data at all or even worse, the data may be misinterpreted and create an unsafe situation. These principles stated in paragraph 3.a.2 are again consistent with the ICAO Annex 15, but have to be extended to cover all forms of modern data based technologies used for aeronautical information management.

100. To complement the framework for aeronautical information described above, it is also essential to establish ways and means for its communication to take place expeditiously and without altering its contents. The hazard created by having erroneous data or receiving such data too late is evident from what is stated above. The purpose of paragraph 3.a.3 is to ensure expeditious and incorruptible transmission of data and is in line with ICAO Annex 15, which however seems to be limited mainly to the traditional applications in this field.

#### *Meteorological information*

101. Safety of an aircraft can be significantly affected by adverse meteorological conditions in any phase of flight. A flight entering adverse meteorological conditions could suffer loss of control, fatal damage to the aircraft or controlled flight into terrain, any of which could lead to the loss of the aircraft. To avoid such situations taking place, the pilot must have available, when planning the flight and during its execution, all the expected meteorological information such as surface and upper winds, visibility, present and forecasted weather conditions, cloud types and their height and atmospheric pressure, along the planned route as well as on the take-off and destination aerodromes. As already stated above for aeronautical information, the quality of meteorological information can not be guaranteed without also assuring the data used as a source for it. Mitigation means to ensure the quality of the source data for aeronautical meteorological information is contained just as a general principle in the ICAO Annex 3, Part I, but those regulatory means needed for its implementation, as developed in paragraph 3.b.1, are clearly outside of its scope.
102. Here again, the quality of aeronautical meteorological information has to be ensured in all phases of its provision assuming that it has to be processed properly, including forecasting, as well as ensured that it is provided in a format understandable to pilots, who have to be able to find all the relevant details therein. Safety risks related to misunderstanding of meteorological data are exactly the same as if there were no data at all or even worse, potentially leading to a situation of pilot making dangerous decisions due to misinterpreted information. The timely provision of meteorological information is also paramount. A severe incident may occur if a SIGMET message (to warn aviators of significant hazardous weather phenomena) has been promulgated too late and therefore an aircraft, with no airborne weather radar, flies into a heavy thunder storm. Paragraph 3.b.2 creates a mandate to specify the quality, timeliness and format of aeronautical meteorological information and is based on the ICAO Annex 3, Part I and II.
103. To close the loop in guaranteeing the quality of aeronautical meteorological information received by airspace users, the paragraph 3.b.3 mandates to ensure that the communication and promulgation of meteorological information takes place on time and without altering its contents. Safety risks are here very similar to the ones mentioned in the previous paragraph. This principle is also from Annex 15, but is again an issue of emerging new technologies, which will improve the quality, availability and promulgation of meteorological information. Regulatory means should be therefore adapted to allow the deployment of such emerging methods and technologies.



### *Air traffic services (ATS)*

104. Air traffic services rely heavily on exchanges of data. Flight and advisory information and ATC commands are of an operational nature presenting new or changed circumstances to the pilot-in-command in cases that have an impact on his/her decisions for the safe conduct of flight. In order for such information or commands to be safely implemented by the pilot, it must be based on source data that is correct, complete and current. Unacceptable safety risks related to the incorrect source data can be various and of different natures, such as an ATC clearance given to depart at a specific time from a given flight level based on incorrect information about other air traffic. Such situations would clearly lead to a reduction in anticipated safety margins, a loss of separation or even a risk of collision with other aircraft. A responsibility to ensure the quality of the data used as a source for any air traffic services is imposed by paragraph 3.c.1. This basic requirement is in line with the principles provided by ICAO, mainly in Annexes 11 and 2 as well as in PANS-ATM Doc 4444, but which however do not address clearly the responsibilities related to ensuring the quality of the source data.
105. In a similar manner as above, the chain of activities resulting in the provision of flight information, air traffic advisory service or air traffic control service has to be able to maintain the sufficient quality and timeliness. For example, an advisory service could provoke a loss of separation, if it unintentionally advised an aircraft to go into the area of another ATS unit in an uncoordinated manner, as a course of action to avoid an area of a thunder storm. This would clearly lead to a reduction in anticipated safety margins. Mitigation of such risks clearly demands proper processing of air traffic services provided for. Paragraph 3.c.2 aims to mitigate inadequate processing of any air traffic services, including human factor related errors therein. As above, this also allows compliance with Annex 11.
106. Also when automated tools are used to provide information for airspace users, the quality and timeliness of that service has to be ensured. If a message for automatic terminal information service (ATIS) is not prepared in a timely manner, it could contain false information on the runway surface conditions and could therefore lead to a loss of control or overrun of the landing aircraft. A similar safety risk could take place, if the ATIS equipment would not operate appropriately due to any technical reasons related to its design, manufacturing or maintenance. This is the purpose of the paragraph 3.c.3, which generally supports the objectives laid down by ICAO. As an example, Chapter 8 of ICAO Annex 14, Volume I, establishes principles for proper design, manufacturing and maintenance for certain air navigation facilities.
107. The purpose of air traffic control, as regards safety, is to prevent any collision between aircraft, and with any obstacle on the ground, as well as providing advice and information useful for the safe conduct of flights. ATC service is a complex combination of determining the relative positions of known aircraft in the area of responsibility, issuing information and clearances for the purpose of safe separation and coordinating clearances with other relevant air traffic control service providers in adjacent areas. Loss of ATC separation is as such an obvious hazard to flight safety. To mitigate such unacceptable safety risks it is required that sufficient personnel have to be available for the anticipated level of service and the procedures used have to be adequate for their intended purpose. Also, in air traffic control there is always a strong aspect of local operational elements such as volume and nature of traffic, aerodrome design and meteorological conditions, which all have to be addressed through standard operating processes. These aspects related to planning and human behaviour in air traffic control are mitigated by the paragraph 3.c.4 stemming again from principles of ICAO Annex 11 and PANS-ATM Doc 4444.

108. Even if the ATC instructions or clearances are correct as such and take into account the specific local environment, it is possible that the pilot still does not understand them or misperceives the information given due to interference, unclear phraseology or an absence of read-back procedures. This could lead, for example a pilot misperceiving a clearance given to another aircraft with a same type of a call sign, to leave the runway-holding position and take the aircraft onto the active runway, which is just receiving a landing aircraft, or to commence a climb to a flight level to which it has not been cleared. Such an error always causes a serious incident and could even lead to a catastrophic accident. Paragraph 3.c.5 requires that mitigation is provided to ensure clear, correct and unambiguous communication, using proper phraseology and read-back procedures, between air traffic control and aircraft. This is again fully in line with Annex 11 and respective PANS-ATM documents.
109. Technical problems on an aircraft may cause the aircraft to crash or to make an emergency landing in an inhospitable area, where it may not be immediately found, and thus causing an extra risk to the safety the pilot and his passengers. That is why paragraph 3.c.6 imposes a requirement to establish appropriate means to monitor such situations and, in the case of an emergency, to alert a coordinated search and rescue activity for finding and saving those persons in distress. These mitigation means are fully in line with what is required by ICAO; when it comes to alerting services as described in Annex 11, Chapter 5, and in relation to search and rescue as provided for in Annex 12.

#### *Communications*

110. Safety of air traffic is very largely based on two way mobile communications between aircraft and ground ATS services and on two way communications between different ground ATS services. These communication services can be implemented through digital data communication or traditional voice communication. In all cases the performance capabilities of the communication services have to be ensured as regards availability, integrity, continuity and timing of this service. For instance, if aircraft in a dense traffic environment suddenly and without any pre-warning fail to receive air traffic control communications, they would have to ensure the safe separation from each other by themselves, leading to a very unsafe situation. Paragraph 3.d.1 addresses the performance requirements for communications as a fundamental element of the safety of air traffic. This is fully in line with communications performance criteria laid down by ICAO in Annex 10 and in Annex 11 – Chapter 6, which both however do not address consistently the ground-ground communications needed in air traffic services. The issue of communication services also has to be elaborated in the sense of emerging modern technologies, such as digital data links, potentially enabling to communicate for example directly to aircraft flight management systems.

#### *Navigation service*

111. Modern aviation is highly dependent on radio navigation aids providing precise positioning and timing information for aircraft in different phases of flight. Within the past decade the introduction of different area navigation (RNAV) applications has allowed aircraft operations on desired flight paths and has thus improved the available airspace capacity and air traffic performances. Such a performance based navigation method is usually dependent on the defined airspace concept, on the airborne equipment, on the navigation aid infrastructure and on the aircrew qualifications. Failure in navigation services in most cases has immediate consequences on the level of safety of aircraft. An aircraft in basic area navigation suddenly loosing its ability for the defined track-keeping accuracy creates an incident and causes a potential risk of loosing the specified separation minima with another aircraft or any segregated airspace. This becomes even more critical when such a situation occurs at the highest point of the air traffic control work load. Paragraph 3.e.1 therefore mitigates hazards

related to the performance of navigation services based on different radio navigation aids. This is fully in line with the principles provided by ICAO in the Annexes 6 and 10, as well as with its corresponding navigation documents and regional navigation plans. On top of what has already been done by ICAO, it is however to be noted that a vast amount of emerging new navigation technologies and methods will be introduced in the future on board an aircraft, on ground and as regards satellite based navigation systems, and will most likely also affect the safety regulatory activities needed.

#### *Surveillance service*

112. Safety of air traffic in controlled airspace and at airports requires that the exact locations of aircraft in the air and of other aircraft and ground vehicles on the airport surface are known by air traffic control and in some cases by pilots when controlling the safe separation by themselves. Air traffic control instructions and clearances, as well as control actions in self separation, have to be based on precise surveillance data, produced by ground radars, ground receivers measuring the aircraft position or aircraft itself transmitting to ground its satellite based position data. Safety of aircraft may be directly affected by the quality of this location data. Misperceiving the exact location of an aircraft in controlled airspace may lead the air traffic control not to take corrective action in case of an aircraft unintentionally getting too close to an active military training area, hence degrading the safety margins planned for such activities. Purpose of paragraph 3.f.1 is to mitigate safety risks related to different types of surveillance services, taking into account the technological developments imminent in this field too. These mitigation means are also in compliance with ICAO SARPs, coming mainly from Annex 10, Volume 4, on radar surveillance and collision avoidance systems.

#### *Air traffic flow management*

113. Overloading the capacity of an air traffic control unit or any of its sectors or the capacity of an airport to receive traffic may affect negatively the level of safety of air traffic. Air traffic flow management services have been established to prevent this overloading to take place. It provides precise and current information of the planned air traffic affecting different service providers and undertakes to coordinate and negotiate rerouting or delaying traffic flows in order to prevent these overloading situations occurring. Point 3.g.1 was developed to cater for the hazards caused by too heavy demand of service provision. In ICAO context the air traffic flow management has been recognised and addressed e.g. in Doc 4444 – PANS-ATM and in regional air navigation plans, but not at the legislative level as anticipated here.

#### *Airspace management*

114. Purpose of airspace management service is to define temporary airspace structures, manage their allocation for specific airspace user needs, monitor their use and provide for precise and current information on their planned and actual availability for general air traffic. ASM service must ensure effective coordination and timely exchange of accurate information between relevant air traffic control units, with military users, with ATFM and with other airspace users whenever appropriate. Accuracy of information on the status of these airspace structures, its timely distribution and effective coordination between relevant airspace and service providers have a direct effect on the safe conduct of flights. Notifying wrong information, in terms of time or flight levels, of the daily availability of a conditional route may lead air traffic control to give a clearance for an aircraft to use this conditional route passing an active danger area. This would be a severe incident that could have catastrophic consequences. This is the object of paragraph 3.h.1 stemming directly from airspace management concept described by ICAO, however allowing developing further implementing rules to mitigate different safety risks related to this activity.

## Mitigation of the hazards related to systems and constituents

### *General*

115. ANS/ATM services are based on a complex network of different systems and constituents forming the technical infrastructure of the concept. These systems and constituents are installed either on aircraft or on the ground or are part of a space-based constellation. They altogether contribute to providing a service that must be safe. Therefore the proposed essential requirements go on to stipulate in paragraph 4.a.1 that systems and constituents must be properly designed, manufactured, maintained and operated to ensure fitness for their intended purpose. If this were not the case, there would be a potential risk of an essential service being partly or totally lost.

### *System and constituent reliability and performance*

116. Paragraph 4.b.1 builds on the previous essential requirement refining that the systems and constituents must meet their expected level of performance for all their foreseeable operating conditions and for their whole operational life. Radar have to function according to its specifications in all foreseen meteorological circumstances; for example the antenna rotation must not be altered if installed in northern altitudes where the antenna may be covered by snow or if installed on coastal sites affected by heavy winds.

### *Design of systems and constituents*

117. A proper functioning of systems and constituents can be guaranteed only if experienced deficiencies in their design, leading to hazardous features, are not left unattended and by that leaving the door open for these events taking place again. Therefore paragraph 4.c.1 requires that, where appropriate, the design of systems and constituents has to be based on quality control ensuring that experience of hazardous features always leads to corrective design activities.
118. Experience has shown that it is not enough to ensure that the design of system, constituent or operating procedure is adequate as a single object. A hazardous feature of an aircraft transponder might occur only when it and its antenna are installed in the aircraft or when it is affected by numerous interrogations in a real traffic environment. Incidents have also taken place between an aircraft on the standard missed approach procedure and departing air traffic, even though the analysis has shown that the go-around procedure as such seems to be designed properly. The purpose of paragraph 4.c.2 is to require that the design of systems and constituents assesses them properly as a part of a total system or concept.
119. A proper functioning of systems and constituents is often dependant on external elements, such as the source of energy or external cooling, or might be affected negatively by human activities. Mitigation of such hazards may in some cases necessitate specific facilities or arrangements for their monitoring and control. Paragraph 4.c.3 establishes a legal mandate to impose this, when necessary by the nature of activity.
120. It is obvious that systems and constituents can not provide for the expected service if not installed, operated and maintained properly. Paragraph 4.c.4 is to create an obligation to ensure that appropriate information for these purposes will always be provided.

### *Continuing level of service*

121. In most safety critical cases the systems and constituents have to be monitored to ensure that the level of service is not negatively altered. Such is the case for example with some navigation systems, whose integrity, reliability and stability of operations has to be continuously monitored. Absence of such measures could lead to a situation of deterioration of the provided signal in space, which in turn could lead to a potential risk to aircraft infringing the required separation minima due to a navigational problem. That is the reason of developing paragraph 4.d.1, based on similar principles as defined by ICAO Annex 10, to ensure continuous monitoring of the most safety critical systems and constituents.

### *Modification of systems and constituents*

122. Modifying systems and constituents must be done in the proper manner. A modification or a reconfiguration of the flight data processing system used in air traffic control service provision, if not carried out properly, could lead to the total loss of essential air traffic service in a significant volume of airspace causing a major safety risk to all controlled aircraft in this airspace. The object of paragraph 4.e.1 is to mandate that any change, modification or reconfiguration must be introduced in accordance with the applicable requirements.

## Mitigation of the hazards related to qualification of air traffic controllers

### *General*

123. It is obvious that the competence of an air traffic controller is essential to flight safety. It is generally agreed that the first competence needed is theoretical knowledge. As insufficient maturity to assimilate training of a demanding nature is seen as a significant hazard, there is a need to provide protection against such a risk. Setting a minimum age would be an option, but such requirement is relatively inflexible and does not take into consideration the various types of training, or the different levels of maturity among individuals of the same age. It has therefore been preferred to define a qualitative requirement that can then be appropriately developed through implementing rules if necessary. This general principle is provided for in paragraph 5.a.1, complying fully with ICAO Annex 1 on personnel licensing. It can be noted here also in more general meaning that this whole section of draft essential requirements of qualification of air traffic controllers provides also a more consistent regulatory framework, which would allow addressing necessary qualification requirements of other personnel, if so decided, in a modern and continuously changing ANS/ATM environment. Moreover, the draft essential requirements developed in this area are compliant with the Directive 2006/23 of the European Parliament and of the Council on a Community air traffic controller licence.

### *Theoretical knowledge*

124. Inadequate theoretical knowledge can prevent an air traffic controller from perceiving the air traffic environment or understanding how his/her activities would affect it. An important basic aspect not to be forgotten, when developing the essential requirements, is that they have to be proportionate to the safety objective. Therefore, the extent of this theoretical knowledge has to be dependant upon the complexity of the functions exercised and proportionate to the risks associated with the type of service in question. This is the basic principle of paragraph 5.b.1 allowing implementing rules to be developed taking into account the different needs by different personnel and in different environments.

125. The theoretical knowledge needed can only be reached through proper training. Inadequate or inappropriate training of air traffic controllers could lead to providing wrong information or instructions to aircraft, to different practices making the interaction with aircraft difficult or in some cases even to a loss of essential service. For these reasons it is essential to ensure the quality of training, by continuous assessment during training or by appropriate examinations, and that the theoretical knowledge has been properly acquired and upheld. Paragraph 5.b.2 concentrates on providing the legal basis for requiring such training methods.
126. Whatever the level of competence, it can deteriorate through time. If this reduction of competence is significant, it can constitute a risk to the quality of service provided and could be detrimental to the safety of aircraft. Therefore, there is a clear need to demonstrate by regular assessments or examinations that competence has not deteriorated. Indeed, paragraph 5.b.3 establishes the need for maintaining theoretical knowledge and introduces a concept of experience in this area. The draft essential requirement also allows the adjustment of the period between checks to the complexity of the functions exercised and to adapt it to the risks associated with the type of service provided for. The more complex the functions exercised, taking also into account the operating environment, the shorter the period between the checks would be.

#### *Practical skill*

127. Practical skill is the second crucial competence that an air traffic controller must have. As stated above in the case of the required theoretical knowledge, the demand for practical skill has to be proportionate to the safety objective and depends upon the complexity of the functions exercised and of the risks associated with the type of service. Paragraph 5.c.1 establishes the need to acquire and maintain the appropriate level of practical skills. The draft essential requirement also specifies some key areas where the practical skills must be developed and possessed without however being limited only to the items listed.
128. Furthermore, one can only be certain that the necessary practical skill is properly acquired and upheld when this is demonstrated to a third party. This basic principle is the reason for paragraph 5.c.2.
129. It goes without saying that in the case of practical skill, the demonstration of compliance must take place by regular assessments or examinations, thus ensuring that competence has not deteriorated through time. Here again the period between checks may vary in relation to the complexity of the functions exercised as defined further by implementing rules in this matter. Paragraph 5.c.3 creates a legal mandate for this differentiation.

#### *Language proficiency*

130. As is already internationally accepted throughout the aviation community and enshrined as a requirement in ICAO Annex 1, as well as provided for by the EU directive on a Community air traffic controller licence, it must be ensured that air traffic controllers can demonstrate the ability to speak and understand English to a satisfactory standard. The use of a common vehicle of communication as this is vital for flight safety. Paragraph 5.d.1 sets the legal basis for air traffic controller proficiency in English.
131. Since it is authorised for pilots to use a local language in certain volumes of airspace, it is for safety reasons unavoidable to impose a similar local language proficiency requirement for air traffic controllers serving such airspace. This is the reason for establishing paragraph 5.d.2.

### *Synthetic Training Devices*

132. Synthetic training devices are used more and more in modern aviation training and in demonstration of practical skills. The Agency has found it therefore necessary to impose qualitative requirements on the level of their performance, where necessary and as appropriate to the training being provided. Paragraph 5.e.1 would mandate this objective.

### *Training Course*

133. A very basic principle of a proper training is that it must be executed through a training course. This means that an adequate level of uniformity in training standards would be ensured and analysed afterwards for possible corrective actions. The significance of training methods in relation to safe services has made it necessary to require this on a legal level, through paragraph 5.f.1.
134. The absence of necessary elements in the training programme could produce air traffic controllers unable to handle critical situations thus creating hazards. For this reason, the draft essential requirements include in paragraph 5.f.2 the need for a training plan.

### *Instructors*

135. The quality of a training course is not the only criteria in good training. The qualifications of the instructor are also a significant factor in all instruction. This naturally contains the appropriate knowledge in the field where instruction is to be given as well as the capability using appropriate instructional techniques. Paragraph 5.g.1 addresses this issue. It is based again on ICAO Annex 1 and is already implemented in the Directive on air traffic controller licence.
136. It goes without saying that qualification criteria have been designed to apply not only to theoretical instruction, but also to instruction on practical skills. However, training on practical skills by its nature necessitates other types of qualifications too. It is widely accepted, that the instructor must know and have experience of the environment and the procedures in which instruction is to be given. The instructor must also receive refresher training to ensure that the instructional standards are maintained up to date. Paragraph 5.g.2 introduces a legal mandate to regulate on the qualifications of instruction on practical skills.
137. Paragraph 5.g.3 requires the instructor to have been entitled to act as an air traffic controller. It goes without saying that an instructor, when supervising a trainee controller on-the-job, has to execute immediate and proper actions if the trainee makes a misjudgement and allows a situation to develop to an unsafe point. This is again in line with ICAO Annex I and with the EU Directive.

### *Assessors*

138. As described above, there is a need for assessment or examinations after training on practical skills in order to verify that appropriate competence has been acquired and maintained. This common principle has again already been established showing that these checks can only be efficient if the examiners are properly qualified themselves. Paragraph 5.h.1 sets out qualification criteria that must be met by these assessors so that they can check an air traffic controller in a proper and harmonised way.
139. As already explained in the case of instructors, the assessor must also have been entitled to act as an air traffic controller. This requirement, provided for in the paragraph 5.h.2, goes further than what is required by ICAO or by the EU Directive, but

is felt to be necessary by the Agency based on safety related experience acquired showing that only a peer can properly judge an air traffic controller competence.

#### *Medical fitness of a person providing an ATC service*

140. It is evident that all persons providing an air traffic control service must be physically and medically fit, taking into account the safety critical nature and specific requirements typical for such functions. This is the basic principle laid down as the medical criteria for air traffic controller in paragraph 5.i.1.
141. Detailed requirements to demonstrate such fitness has then to be provided for in the respective implementation rules. This must include the demonstrated absence of any disease or disability, which makes the person providing an ATC service unable to execute the necessary tasks properly, to perform assigned duties at any time or to perceive correctly his/her environment. The latter criteria are meant also to address situations of personnel being unfit to discharge their duties due to the use of any psychoactive substances. Paragraph 5.i.1 concentrates on providing the legal basis for the assessments and examinations necessary to demonstrate the ability of a person providing a safety critical service to execute his/her functions.
142. Moreover, paragraph 5.i.2 allows deviations when appropriate mitigation measures can be implemented to ensure that the level of safety is maintained. A person may be unfit to exercise all the functions of an air traffic controller though under certain conditions, such as adapted procedures or equipment, or a limitation of the tasks that can be exercised, pose no risk to air traffic. This is important, as declaring a person whose capacities are only slightly diminished completely unfit would lead that person to loose his/her profession unnecessarily.

#### Mitigation of the hazards related to service providers and training organisations

##### *General*

143. As demonstrated by various hazards in this field, safety of air traffic in many cases is dependant on a proper provision of defined ATM/ANS services, which in turn assumes that an ineffective organisation of work within a service provider may lower the level of safety and may consequently contribute to the development of these hazards. Therefore it is indispensable to ensure that the organisations in question have adequate means to deliver the intended services. Requirements presented in section 6.a have been designed to establish conditions to be met by these organisations and to ensure that they fulfil their obligations.
144. ATM/ANS service providers and ATC training organisations have to be able to provide services in a safe, continuous and sustainable manner consistent with a reasonable level of the overall demand. The complex nature of their functions and a strong need for interaction and careful coordination requires that bodies involved must put in place and maintain high performance management systems covering relevant systems and constituents, facilities, management structure, personnel, documentation of tasks, responsibilities and procedures, access to relevant data and record keeping so as to promote a real safety culture. A provider of air traffic control services not having defined management structures and therefore not being able to give systematically priority to safety would be very vulnerable to blurred responsibilities in service provision, which in turn would clearly be a contributing factor for safety hazards. This is the reason for paragraph 6.a.1 requiring the establishment of appropriate management structures. This is consistent with the ICAO SARP's in Annex 11 and with the certification scheme developed through the SES implementation regulation laying down common requirements for the provision of air navigation services as well as with the EU



Directive on a Community air traffic controller licence when it comes to the provision of air traffic controller training.

145. Again, the complexity and volume of operations in ATM/ANS service provision requires the organisation to operate in a standardised manner to provide for a comparable level of safety in all circumstances and through all services provided. For this, their operations must be carried out according to management and operations manuals so that all personnel are able to work in the same consistent manner at all times and facilitate the communication with other organisations involved in service provision as well as with different airspace users. Poor communication leads to misunderstandings that can be the cause of an accident or incident. This is why the paragraph 6.a.2 imposes for the establishment of appropriate organisational manuals in a very similar manner than required by ICAO safety management manual and as is required in the SES common requirements.
146. The main obligation of ATM/ANS service provider and ATC training organisations is to ensure that the services provided comply with the relevant essential requirements of this Annex. If for any reason, as an example, the flight information provided to air traffic becomes non-compliant, the service provider must ensure remedial action is taken or necessary mitigating measures are put in place. This is to avoid the hazards created by the operation of aircraft based on a critical service that no longer complies with the relevant mitigating measures defined. Moreover, a systematic risk assessment and mitigation has to be conducted for any changes to the elements in the chain of safety critical safety provision to ensure the continuous compliance with essential requirements. This basic principle of a risk based management system is laid down in paragraph 6.a.3.
147. As has already been explained in the paragraphs related to regulated professions it is clear that the competence of a person executing safety critical tasks related to ANS/ATM service provision is essential to flight safety. This principle can be imposed as an organisational responsibility to maintain the professional qualifications of personnel in safety critical tasks by training and checking programmes. The level of competence of persons can deteriorate through time or the knowledge base used in initial training may go out of date in relation to changes in the concept of operations, which may therefore constitute a safety risk in service provision in a form of a wrong instruction to a pilot or as an inability to control properly a dense traffic situation. That is why paragraph 6.a.4 introduces the need for organisations to ensure the ability of persons in safety critical tasks to execute their duties properly and to maintain such competency. This fully complies with organisational responsibilities established by ICAO SARP's and by SES common requirements for the provision of air navigation services.
148. The safe execution of ANS/ATM services consists of several functions and interactions by a chain of different organisations and persons. The ANS/ATM service provider is one of these actors, whose own operations have to be safe, but which also have to be interfaced and coordinated in a safe way with other relevant parties in a service chain. This is very true for example in case of air traffic control service for aerodrome traffic, which definitely must have clear and unambiguous interactions with those in charge of controlling the use of various vehicles on the movement area of an aerodrome. If this were not the case, it would cause a potential safety risk of a collision between any vehicle and aircraft. The significance of coordination in relation to safe service provision has made it necessary to require this on a legal level, as is the case in paragraph 6.a.5. This has been one of the overriding principles also for ICAO when imposing requirements to the various actors within aviation.
149. It is an essential part of the safe ANS/ATM service provision that emergency situations and events of disruption of services are proactively planned and implemented through formal contingency planning. If an area control centre suddenly loses its flight data

processing capabilities it must have formal procedures on how to coordinate the situation with aircraft under its control, with neighbouring area control centres as well as with approach and tower control units within the FIR. It is therefore essential to mitigate related risks with emergency measures planned beforehand. These measures are mandated in paragraph 0 and they reflect provisions in ICAO Annex 11, Chapter 2 and the Attachment D, as regards air traffic services.

150. A system for occurrence reporting and analysis is one of the cornerstones for the management of aviation safety. This is not contested by anyone and it is already legally imposed by the Community legislation in other areas of aviation safety as well as in ATM through the SES common requirements. These very same grounds are shared by ICAO and stated in its safety management manual. This broad and consistent basis needs to be enhanced by further complementary implementation measures in relation to ATM/ANS service provision and ATC training. Such is the background for paragraph 6.a.7.
151. As regards technical systems and constituents in ATM/ANS service provision, the safety regulatory means should impose for minimum performance requirements vital to safe operation of air traffic instead of regulating on their technical implementation. It is then for the service provider to ensure that these performance criteria are continuously met or, when this is not the case, to implement appropriate mitigating measures. This is the purpose of paragraph 6.a.8.

#### *ATC service provision*

152. Air traffic control (ATC) services have a principal safety objective to prevent collisions between aircraft and between aircraft and any obstruction on the ground. The significant nature of these services makes it necessary to impose specific mitigation means for organisations in charge of these services. Requirements presented in this section 6.b have been developed to establish specific conditions to be met by these organisations and to ensure that they fulfil the requirements imposed.
153. Nobody contests that air traffic controllers are key players to ensuring the safety of air traffic in case of controlled flights and especially as regards those parts of airspace used by high volumes of aircraft. As shown by experience and indicated by various safety occurrences the ATC personnel can only execute well their tasks if they are not fatigued. Fatigue is a potential cause of reduced performance from which there is no certainty that a person can be aroused in a demanding situation. It is therefore important that measures are taken to manage fatigue and ensure appropriate limitation to duty periods and duty time as well as ensure sufficient rest before a duty is undertaken again. That should be done through an appropriate rostering system. Such is the objective of paragraph 6.b.1 that covers also the intent of SARP's in ICAO Annexes related to this subject.
154. It is also well known that other human factors, such as stress, may affect a person's abilities to execute their duties properly. This should be regarded as a safety hazard in such working environments as ATC, which requires a high level of judgement and comprehension. Therefore paragraph 6.b.2 mandates the development necessary means to be implemented by the ATC service providers to mitigate such risks.
155. As a continuation to the two paragraphs above, it is well recognised also in this field that the cognitive judgement of personnel can be impaired because of other reasons, such as the influence of any psychoactive substances. The intent of paragraph 6.b.3 is to ensure that the ATC service providers have appropriate procedures to address such risks where appropriate.

156. It has been established in the first section of this Annex that in order to prevent safety risks caused by insufficient service provision capacity, means must be established to ensure that air traffic volumes do not exceed the maximum airspace design capacity. In line with this it is also necessary to impose that ATC service providers base their planning of operations to these established maximum values and that they have appropriate means to limit entry of traffic into the airspace due to safety reasons. Paragraph 6.b.4 establishes these principles.

*Communication, navigation and surveillance service provision*

157. Provision of air traffic services is highly dependent on communication, navigation and surveillance services providing appropriate means for exchanging information between ATS services and air traffic, providing accurate positioning data for aircraft and giving precise data for the ATC units on the position of air traffic. For example, a loss of communication capability of an ATC unit would cause a total loss of an essential service related to safety of air traffic. It is therefore necessary to establish an organisational requirement for the communication, navigation and surveillance service providers to keep relevant parties informed on a timely basis of the operational status of their services. This is imposed in paragraph 6.c.1, which is fully in line with the principles of ICAO SARP's in Annexes 10 and 11.

*Training organisations*

158. The ATC training provision has been regarded as an important factor contributing to the quality of ATC service provision and therefore being an aspect of safety relevance. A high and uniform level of ATC provision is significant, not only in relation to single service provider, but especially at the interface between different service providers. This is also the line taken in the EU Directive on Community air traffic controller licence. For these reasons a paragraph 6.d.1 provides for that ATC training providers have appropriate means and management structures to ensure a high level of ATC training.

## II Essential requirements for air traffic management and air navigation services

### 1. Concept of Operations<sup>10</sup>

- 1.a. *Management of any specified volume of airspace must be governed by a concept of operations, which includes its services, underlying functional architecture and associated processes. It shall minimise the risk of insufficient aircraft separation (between aircraft and with any obstacle on ground), collision and full or partial loss of essential service.*
- 1.b. *The concept of operations must address the complexity of the airspace and expected traffic characteristics (such as density and nature), level of service to be delivered and any other relevant operational considerations*
- 1.c. *The concept of operations shall address all the necessary elements needed to safely manage the volume of airspace, such as;*
  - 1.c.1. *airspace design,*
  - 1.c.2. *aerodrome operations,*
  - 1.c.3. *demand and capacity balancing,*
  - 1.c.4. *traffic synchronisation,*
  - 1.c.5. *conflict management,*
  - 1.c.6. *service delivery;*
  - 1.c.7. *the roles and responsibilities of the different parties; and*
  - 1.c.8. *interactions with neighbouring airspace governed by different concepts of operations*
- 1.d. *The maximum airspace capacity and type of operations authorised shall, where appropriate, be defined based on the above criteria and shall address all the necessary elements needed to safely manage the volume of airspace.*
- 1.e. *A mechanism must be established to ensure that air traffic volumes do not exceed the maximum airspace capacity.*
- 1.f. *Before implementation occurs, the concept of operations, as well as any subsequent change, must be validated.*
- 1.g. *Sufficient and adequate electromagnetic spectrum for aeronautical communications has to be ensured as a basis for the concept of operations. Assignment of frequency channels to aeronautical communications shall prevent electromagnetic interferences.*

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<sup>10</sup> This section of the Essential requirements is reserved until it can be clarified what regulated organisation is responsible for its implementation: see question 1 in the NPA.

## 2. Use of the Airspace

- 2.a. All aircraft, in all phases of flight or on the movement area of an aerodrome shall be operated in accordance with common general operating rules and any procedure specified for the use of that airspace in accordance with the applicable concept of operations.
- 2.b. All aircraft must be equipped with all suitable appliances required by the applicable concept of operations and operated accordingly. Appliances, for their use in the ATM/ANS system, are considered as constituents and shall also comply with the related Essential Requirements.

## 3. Services

When provided to meet the conditions of the concept of operations, services must comply with the following requirements.

### 3.a. Aeronautical information

- 3.a.1. The data used as a source for aeronautical information must be of sufficient quality, complete, current and provided in a timely manner.
- 3.a.2. The resulting aeronautical information must be accurate, complete, current, unambiguous and in a suitable format for users.
- 3.a.3. The dissemination of such aeronautical information to airspace users must be timely, of adequate integrity and using sufficiently secure, incorruptible and expeditious methods of communication.

### 3.b. Meteorological information

- 3.b.1. The data used as a source for aeronautical meteorological information must be of sufficient quality, complete and current.
- 3.b.2. The resulting aeronautical meteorological information must be sufficiently precise, complete, current and unambiguous to meet the needs of airspace users.
- 3.b.3. The dissemination of such aeronautical meteorological information to airspace users must be timely, of adequate integrity and using sufficiently secure, incorruptible and expeditious methods of communication.

### 3.c. Air traffic services

- 3.c.1. The data used as a source for the provision of flight information, advisory services and control services for the air traffic must be correct, complete and current.
- 3.c.2. The resulting flight information, advisory services and control services provided for the air traffic must be sufficiently precise, complete, current, and unambiguous to meet the needs of users.

- 3.c.3. Automated tools providing information or advice to users must be properly designed, manufactured and maintained to ensure fitness for their intended purpose.
- 3.c.4. Air traffic control services and related processes must provide for sufficient separation between aircraft and with obstacles on ground of all air traffic under its control and ensure a prompt and timely coordination with all relevant users.
- 3.c.5. Communication between air traffic control and aircraft must be timely clear, correct, unambiguous, free from intrusion and commonly understood and acknowledged by all actors involved.
- 3.c.6. A means must be in place to detect possible emergencies, and, when appropriate, to initiate and implement an effective search and rescue action. Such means must, as a minimum, comprise of appropriate alerting mechanisms, coordination measures and procedures, means and personnel to efficiently cover the area of responsibility.

3.d. Communication services

- 3.d.1. Communications must achieve and maintain sufficient performance capability, including criteria for availability, integrity, continuity and timeliness of the service. They must be secure, incorruptible and expeditious.

3.e. Navigation service

- 3.e.1. Aeronautical radio navigation service must achieve and maintain sufficient performance of the provided positioning and, when provided, timing information, including criteria for its accuracy, integrity, availability and continuity.

3.f. Surveillance service

- 3.f.1. Surveillance service must determine the respective position of aircraft in the air, and of other aircraft and ground vehicles on the airport surface, with sufficient performance, including criteria for its accuracy, integrity, continuity and probability of detection.

3.g. *Air traffic flow management*<sup>11</sup>

- 3.g.1. *Air Traffic Flow Management service must provide for sufficiently precise and current information of the volume and nature of the planned air traffic affecting service provision and must coordinate and negotiate rerouting or delaying traffic flows in order to prevent overloading situations occurring in the air or at the aerodromes.*

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<sup>11</sup> This section of the Essential requirements is reserved until it can be clarified whether this function is or not of a regulatory nature: see question 3 in the NPA.

### 3.h. *Air space management*<sup>12</sup>

- 3.h.1. *Use of specific restricted areas has to be approved, monitored, coordinated and timely promulgated in order to prevent any loss of separation between aircraft in all circumstances.*

## 4. Systems and Constituents

### 4.a. General

- 4.a.1. Systems and constituents providing information to and from the aircraft and on the ground must be properly designed, manufactured, maintained and operated to ensure fitness for its intended purpose.

### 4.b. System and constituent reliability and performance

- 4.b.1. The integrity and performance of systems and constituents, considered separately and in relation to each other, whether on aircraft, on the ground or in space, must be assured to be fit for their intended purpose. They must meet the expected level of performance required by the concept of operation for all their foreseeable operating conditions and for their whole operational life.

### 4.c. Design of systems and constituents

- 4.c.1. Systems and constituents must not have design features or details that experience has shown to be hazardous.
- 4.c.2. Systems and constituents, considered collectively, separately and in relation to each other, must be designed in such a way that any failure cannot result in a total system failure or a full loss of service, unless it is shown to be extremely improbable.
- 4.c.3. Systems and constituents must be designed and operated in a manner that protects them from dangerous interactions with external elements. Hazards related to human activities that could lead to such interactions must be monitored and controlled. The risk caused by them shall be assessed and mitigated as appropriate.
- 4.c.4. Information needed for the safe installation, operation and maintenance of the systems and constituents as well as information concerning unsafe conditions must be provided to operating personnel or maintenance personnel, as appropriate, in a clear, consistent and unambiguous manner.

### 4.d. Continuing level of service

- 4.d.1. Where relevant, means must be provided to allow performance monitoring and reconfiguration of systems and constituents as necessary to maintain the level of service.

### 4.e. Modification of systems and constituents

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<sup>12</sup> This section of the Essential requirements is reserved until it can be clarified whether this function is or not of a regulatory nature: see question 3 in the NPA.

- 4.e.1. Systems and constituents may be modified to enhance the level of service. When so doing, they must continue to comply with the essential requirements in this section. When modifications are implemented during operations, a change process must be developed so as to ensure that a minimum level of service is maintained.

## 5. Qualification of air traffic controllers

### 5.a. General

- 5.a.1. An air traffic controller undertaking training must be sufficiently mature educationally, physically and mentally to acquire, retain and demonstrate the relevant theoretical knowledge and practical skill.

### 5.b. Theoretical knowledge

- 5.b.1. An air traffic controller service must acquire and maintain a level of knowledge appropriate to the functions exercised and proportionate to the risks associated with the type of service.
- 5.b.2. The acquisition and retention of theoretical knowledge must be demonstrated by continuous assessment during training, or by appropriate examinations.
- 5.b.3. An appropriate level of theoretical knowledge must be maintained. Compliance must be demonstrated by regular assessments or examinations. The frequency of examinations must be proportionate to the level of risk associated with the type of service.

### 5.c. Practical skill

- 5.c.1. An air traffic controller must acquire and maintain the practical skills as appropriate to exercise his/her functions. Such skills must be proportionate to the risks associated to the type of service and must cover at least, if appropriate to the functions exercised, the following items:
  - i Operational procedures
  - ii Task specific aspects
  - iii Abnormal and emergency situations
  - iv Human factors
  - v Threat and error management
- 5.c.2. An air traffic controller must demonstrate the ability to perform the associated procedures and tasks with a level of competence appropriate to the functions exercised.
- 5.c.3. A satisfactory level of competence in practical skill must be maintained. Compliance must be demonstrated by regular assessments or examinations. The frequency of these assessments must be proportionate to the level of risk associated with the type of service.



#### 5.d. Language Proficiency

- 5.d.1. An air traffic controller must have demonstrated proficiency to speak and understand English to the extent he/she is able to communicate effectively in voice-only (telephone/radiotelephone) and in face-to-face situations with flight crews and other related personnel on concrete and work-related topics, including in emergency situations.
- 5.d.2. Whenever it is necessary in a defined volume of airspace for ATC service provision purposes, a person providing an ATC service must also have proficiency to speak and understand the local language(s) to the extent described above.

#### 5.e. Synthetic Training Devices

- 5.e.1. When STD is used for practical training on situational awareness and human factors or for demonstration that skill is acquired or maintained, it must have a level of performance that allows adequate replication of the working environment and operational situations appropriate to the training being provided.

#### 5.f. Training Course

- 5.f.1. Training must be executed through a training course.
- 5.f.2. A training course must meet the following conditions:
  - i a training plan must be defined and approved for each type of course; and
  - ii a training course may comprise theoretical and practical instruction, including synthetic training, if applicable

#### 5.g. Instructors

- 5.g.1. Theoretical instruction must be given by appropriately qualified instructors. They must:
  - i have appropriate knowledge in the field where instruction is to be given; and
  - ii be capable of using appropriate instructional techniques
- 5.g.2. Instruction on practical skills must be given by appropriately qualified instructors, who have the following qualifications:
  - i meet the theoretical knowledge and the experience requirements appropriate for the instruction being given;
  - ii be capable of using appropriate instructional techniques;
  - iii have practiced instructional techniques in those procedures in which it is intended to provide instruction;
  - iv have demonstrated the ability to instruct in those areas in which instruction is to be given; and
  - v receive regular refresher training to ensure that the instructional standards are maintained up to date
- 5.g.3. Instructors on practical skills must also be or have been entitled to act as an air traffic controller.

#### 5.h. Assessors

5.h.1. Persons responsible for assessing the skill of personnel providing a safety critical service must:

- i be capable of assessing the performance of, and conducting tests and checks on air traffic controllers;
- ii have demonstrated the ability to assess in those areas in which assessment is to be made; and
- iii receive regular refresher training to ensure that the assessment standards are maintained up to date

5.h.2. Assessors on practical skills must also be or have been entitled to act as an air traffic controller.

#### 5.i. Medical fitness of an air traffic controller

##### 5.i.1. Medical criteria

5.i.1.i. All air traffic controllers must periodically demonstrate medical fitness to satisfactorily execute their functions. Compliance must be shown by appropriate assessment taking into account the possible mental and physical degradation due to age.

5.i.1.ii. Demonstration of medical fitness, comprising physical and mental fitness, shall include the demonstrated absence of any disease or disability, which makes the person providing an ATC service unable:

- i to execute properly the tasks necessary to provide air traffic control service; or
- ii to perform assigned duties at any time; or
- iii to perceive correctly his/her environment

5.i.2. Where medical fitness cannot be fully demonstrated, mitigation measures that provide equivalent safety may be implemented.

### 6. Service providers and training organisations

6.a. Service provision must not be undertaken unless the following conditions are met:

6.a.1. The service provider must have directly or indirectly through contracts the means necessary for the scale and scope of the service. These means comprise but are not limited to the following: systems and constituents, facilities, management structure, personnel, equipment and its maintenance, documentation of tasks, responsibilities and procedures, access to relevant data and record keeping;

6.a.2. The service provider must develop and keep up-to-date management and operations manuals relating to the provision of its services and operate in accordance with those manuals. Such manuals must contain all necessary instructions, information and procedures for the operations, the management system and for operations personnel to perform their duties;

- 6.a.3. The service provider must implement and maintain a risk based management system to ensure compliance with the essential requirements in this Annex and aim for continuous pro-active improvement of this system;
  - 6.a.4. The service provider must use only suitably qualified and trained personnel and implement and maintain training and checking programmes for the personnel;
  - 6.a.5. The service provider must establish formal interfaces with all the other contributors to the service provision which may affect compliance with the present Essential Requirements
  - 6.a.6. The service provider must establish and implement a contingency plan covering emergency and abnormal scenarios that may occur in relation to its services; and
  - 6.a.7. The service provider must establish and maintain an accident prevention and safety programme including an occurrence reporting and analysis programme, which must be used by the management system in order to contribute to the aim of continuous improvement of safety.
  - 6.a.8. The service provider must make arrangement to verify that the performance requirements of any system and constituent they operate are met at any time.
- 6.b. ATC service provision must not be undertaken unless the following conditions are met;
- 6.b.1. The prevention of fatigue of personnel providing an ATC service must be managed through a rostering system. Such a rostering system needs to address duty periods, duty time and adapted rest periods. Limitations established within the rostering system must take into account all relevant factors contributing to fatigue such as, in particular, deprivation, disruption of circadian cycles, night hours, cumulative duty time for given periods of time and also the sharing of allocated tasks between personnel.
  - 6.b.2. The prevention of stress of personnel providing an ATC service must be managed through the education and prevention programmes.
  - 6.b.3. The ATC service provider must have in place procedures to verify that the cognitive judgement of personnel providing ATC services is not impaired or their medical fitness insufficient.
  - 6.b.4. The ATC service provider must take into account operational and technical constraints as well as human factor principles in their planning (including maximum design capacities) and operations. The ATC service provider shall at any time limit entry of traffic into the airspace when these constraints or principles may be compromised.
- 6.c. Communication (C), Navigation (N) and/or Surveillance (S) service provision must not be undertaken unless the following conditions are met:
- 6.c.1. The C, N or S service provider must keep relevant airspace users and ATS units informed on a timely basis of the operational status (and changes thereof) of their services provided for ATS purposes.

#### 6.d. Training organisations

6.d.1. A training organisation providing training for personnel providing an ATC service must meet the following requirements:

- i have all the means necessary for the scope of responsibilities associated with their activity. These means comprise, but are not limited to, the following: facilities, personnel, equipment, methodology, documentation of tasks, responsibilities and procedures, access to relevant data and record-keeping;
- ii implement and maintain a management system relating to safety and the standard of training, and aim for continuous improvement of this system; and
- iii establish arrangements with other relevant organisations, as necessary, to ensure continuing compliance with these essential requirements