



WORKING PAPER

TWELFTH AIR NAVIGATION CONFERENCE

Agenda Item 6: Future direction

6.2: Standardization – approach to SARPs development in support of One Sky

SAFETY AND SAFETY REGULATION

(Presented by the Presidency of the European Union on behalf of the European Union and its Member States¹; by the other Member States of the European Civil Aviation Conference²; and by the Member States of EUROCONTROL)

EXECUTIVE SUMMARY

This paper summarizes the development of safety concepts needed to ensure that the proposed aviation system block upgrades (ASBUs) can be implemented.

The European air traffic management system is safe, efficient and economic. Changes to that system need to ensure that it is capable of fulfilling aviation growth potential. It becomes a flexible system that encourages innovation, and encourages new opportunities for improvement.

Action: The Conference is invited to agree to the recommendation in paragraph 4

1. INTRODUCTION

1.1 The vision of the European air traffic management system may be summed-up as follows: 1. A system that is safe (an overriding objective), efficient and economic; 2. A complete system that is capable of fulfilling aviation growth potential; 3. A flexible system that encourages innovation, and encourages new markets to evolve; 4. A dynamic system that responds to the demands of the passenger and the airspace user; and 5. A system in which the human remains at the centre of the system.

1.2 Like the GANP, it is introducing significant changes to ATM/ANS and therefore to the aviation system. Indeed the changes proposed impact all actors and not only the ATM/ANS community. The changes that are planned will lead to a system of systems where the conventional aviation industry boundaries are no longer the optimal approach:

1. Traffic synchronization: Initial 4-D trajectory operations + calculated time of arrival (CTA); integrated arrival and departure management (AMAN DMAN) and extended AMAN horizon.
2. 4D trajectory management: Trajectory management through the use of business/mission trajectory; system interoperability with air/ground and ground/ground data sharing; free routing; airborne and ground safety nets.

¹ Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and United Kingdom. All these 27 States are also Members of ECAC.

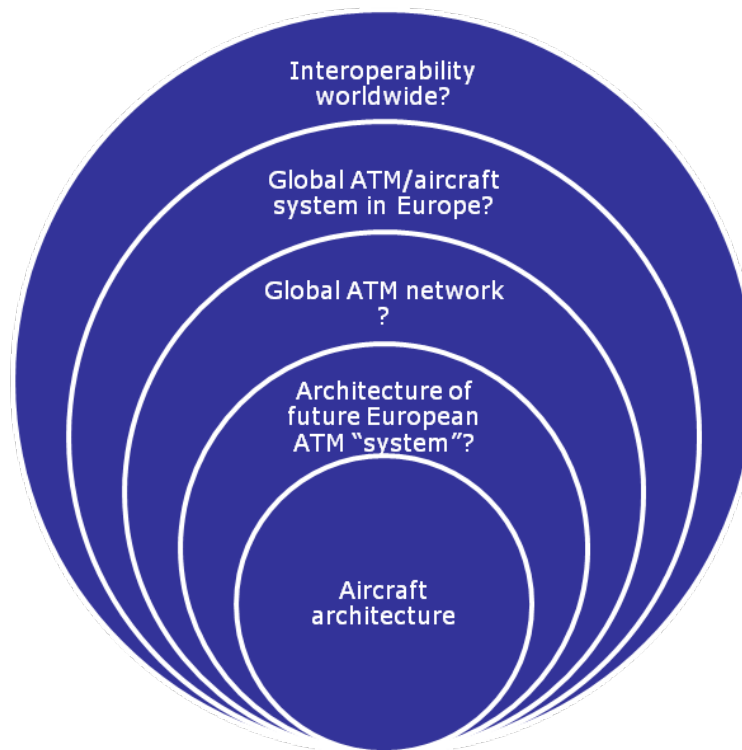
² Albania, Armenia, Azerbaijan, Bosnia and Herzegovina, Croatia, Georgia, Iceland, Moldova, Monaco, Montenegro, Norway, San Marino, Serbia, Switzerland, The former Yugoslav Republic of Macedonia, Turkey and Ukraine.

3. Network management (network operations planning) using airspace users business/mission trajectory planning and airport operations planning.
4. SWIM information exchange models over IP-based networks, SWIM service modelling and infrastructure requirements.
5. Airport integration and throughput; airport operations planning (A-CDM) connected to civil and military airspace user flight planning and network operations planning, surface management integrated with arrival and departure and airport safety nets.
6. Conflict management and automation: Enhanced DST and PBN: conflict detection and resolution.

1.3 In addition, while the human remains at the centre of the system, the aviation system in general is becoming more and more:

- a) global;
- b) networked;
- c) complex;
- d) performance driven; and
- e) environmentally driven.

1.4 The diagram below illustrates the globality, the complexity and the network aspect of the aviation system.



1.5 A single European ATM system performance needs to be subject to continuous improvement. Safety must remain paramount and a set of key messages for safety and safety regulation need to be re-emphasized.

2. CHALLENGE

2.1 ATM supported by data integration and collaborative decision making requires a high degree of coordination among the stakeholders and competent authorities. Safety can be assured if that coordination is active and momentous.

2.2 The many components of a conventional ATM system are arranged as a system of discrete parts. Current practices focus on controlling the interfaces between the discrete parts of the system. Planned technologies, as illustrated by the aviation system block upgrades (ASBUs), drive significant architectural and automation changes to the conventional ATM system. Highly integrated and complex airborne/ATM services require the containment for the effects of common design errors spanning over the end-to-end service. Tight levels of integration and interdependencies mean that the conventional “piecemeal” approach is no longer adequate to address the safety, interoperability and performance challenges.

2.3 ATM is international by its nature and safety cannot be separated from the need for global interoperability. Indeed, safety requirements must be harmonized worldwide if we want to ensure that a system certified to perform a given function in a region is also able to perform the same function in another region.

2.4 The introduction of safety management brings about an opportunity to ensure the highest common standards of safety in civil aviation in Europe and Worldwide. The State safety programmes and plans are an essential component of this safety management. In Europe, the sharing of responsibilities between Member States, the Commission and EASA lead to the development of a European aviation safety programme and plan that should be the foundations of the individual states programmes and plans.

3. PROPOSAL

3.1 Safety is the highest priority for all aviation actors. To make this general statement meaningful, a set of key messages that can be implemented was developed:

1. Promote highest common standard of safety are applied in civil aviation worldwide:
 - a. This is an aspiration that is consistent with the principle of continuous improvement included in Safety Management Systems.
2. Promote a risk based approach:
 - a. This principle is consistent with the continuous monitoring approach adopted by ICAO and will allow to allocate resources where they provide the most results.
3. Promote the concept of total system approach in particular for safety and safety regulation: a total system approach may be broadly defined as a coordinated, multi-disciplinary approach to safety issues with particular attention brought to the resolution of interfaces and apportionment of the risk budget.
 - a. The need for a total system approach is justified by the following elements:
 - i. A coordinated approach for the airborne and the ATM domains needs to be developed in order to address safety, performance and interoperability of tightly coupled airborne/ATM services.
 - ii. Several safety issues such as the effect of climate change on aviation safety; runway excursions or runways incursions can only be solved by a multi-disciplinary approach.
4. Promote objective based approach to safety regulation:
 - a. European Union regulation, and the need for ICAO SARPS, needs to include safety as a primary objective Prescriptive safety regulations could prevent the implementation of new technical concepts, even though in some cases (e.g. aerodrome markings colour coding) they should be used as they are conducive to harmonization. The proposed regulatory approach could

be called objective-based regulation. The binding elements included in a rule should be the following:

- i. Who must comply: identifications of the entities subject to the rule?
 - ii. What must be complied with: the critical elements for safety? For example, this could describe the function to be carried on board an aircraft.
 - iii. When does the rule enter into force: this should list the applicability dates.
- b. This model could work at national, regional and global (ICAO) level. Appropriate procedures would need to be developed addressing in particular:
- i. Definition of a hierarchy of texts.
 - ii. Definition of the authority adopting the text.
 - iii. Open and transparent consultation processes.
 - iv. Definition of appropriate regulatory and standardization roadmaps.
- c. The idea is to create a system that ensures safety by mandating the critical elements in a rule and at the same time allow for the necessary flexibility to accept new technologies. Also interoperability is ensured by the existence of the standards. This approach is a pre-requisite to an increased use of Industry standards.

5. Encourage:

- a. The use of industry standards and encourage coordination between standardization bodies:
 - i. Standards form fundamental part of the aviation regulatory system. The importance of standards is expected to increase in the future. This paper welcomes ICAO's intention of making more and better use of industry standards to complement the ICAO Standards and Recommended Practices (SARPs). This would allow to have non-prescriptive requirements (for example not drafted based on a certain technology) and to include in acceptable means of compliance the necessary specification for a given technology to meet the rule. This will ensure that essential requirements are clearly defined and at the same time allow for flexibility. A more detailed paper has been prepared by Europe on the issue of standardization³
- b. An open dialogue with Stakeholders and in particular the use of open and transparent processes for safety rulemaking:
 - i. Safety regulators should promote an open dialogue with the industry in particular on safety rulemaking and respond to the needs for change while respecting agreed safety objectives. Evidence must be inspected to show that safety objectives have been satisfied. The tightly coupled ATM system and the fact that changes in the ATM actually affects the whole Aviation system make very necessary that safety rulemaking is done in an open and transparent manner to ensure that all impacts and interfaces are properly handled.

6. Promote the development of:

- a. SMS (safety management system);
- b. SSP (State safety programmes)
- c. SSP and SMS should be promoted together with their enablers:
 - i. Occurrence reporting and analysis;
 - ii. Just Culture;
 - iii. Incorporation of human factors principles;
- d. Such systems and programmes are necessary to ensure continuous improvement, to master complexity in a safe manner and to facilitate the incorporation of tools that assist front line

³ An-Conf/12-WP/61 Regulation and standardization in support of the European ATM Master Plan

actors (e.g. pilots and controllers). Automation will be present everywhere as described in another paper prepared by Europe⁴.

3.2 These key messages come in support of the European paper on strategic approach to modernize ATM⁵. Such a strategy must include a strong safety component.

3.3 Based on the experience in ATM, the Commission is considering its Communication COM (2011) 670 final⁶, to extend the performance scheme to other aviation domains. However, it will consult stakeholders and conduct an impact assessment before bringing forward proposals for performance schemes for other aviation safety domains. This is a long term challenging aspiration that would start by the establishment of a road map identifying for example by which domain or domains to start, what would be key performance areas, etc. The EASA has just had the first discussions in its EASAC (European Aviation Safety Advisory Committee) which is the body advising on the development and implementation of the European Aviation Safety Programme and Plan.

4. ACTION BY THE CONFERENCE

4.1 The Conference is invited to:

- a) promote highest common standard of safety are applied in civil aviation worldwide;
- b) promote a risk based approach;
- c) promote the concept of total system approach in particular for safety and safety regulation;
- d) promote safety objectives in rulemaking;
- e) encourage:
 - 1) the use of industry standards and encourage coordination between standardization bodies; and
 - 2) an open dialogue with Stakeholders and in particular the use of open and transparent processes for safety rulemaking;
- f) promote the development of:
 - 1) safety management system (SMS); and
 - 2) state safety programmes (SSP) together with their enablers: occurrence reporting and analysis; just culture; and incorporation of human factors principles.

— END —

⁴ An-Conf/12-WP/34 Development of an aviation automation policy

⁵ An-Conf/12-WP/28 A strategic approach for modernizing the ATM system

⁶ Communication from the Commission to the Council and the European Parliament: Setting up an Aviation Safety Management System for Europe