



International Civil Aviation Organization

NORTH AMERICAN, CENTRAL AMERICAN AND CARIBBEAN OFFICE

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Agenda Item 3: Specific Air Navigation Activities and Developments
3.5 Air Traffic Management (ATM)

ATM SAFETY MANAGEMENT

(Presented by the Secretariat)

SUMMARY

This paper analyzes the aspects related with ATM safety management concerning the provisions of ICAO for the States/Territories/International Organizations to develop an action plan to implement ATS safety programmes in the airspace and aerodromes under their jurisdiction.

References:

- Doc 7300 *Convention on international civil aviation*
- Annex 11
- Doc 4444, PANS-ATM
- Report of the Eleventh Air Navigation Conference Montreal (22 September to 3 October 2003)
- ATM operational Concept
- *Manual of Safety Management for Aerodromes and Air Traffic Services.*

1. Introduction

1.1 Safety is considered the most important activity of global aviation, and it is reflected in the objectives and targets of ICAO. Based on Article 44 of the *Convention on international civil aviation* (Doc. 7300), commonly known as the Chicago Convention, ICAO is entrusted to foster a worldwide safe and ordered growth of civil aviation. In light of this convention, the States agreed to be responsible for the compliance with ICAO SARPs or else to inform about their differences to them.

1.2 ICAO has established a Global Aviation Safety Plan (GASP) in order to reduce accidents and incidents, not as an independent activity, but as a mechanism presenting and allowing the consolidated notification of all these activities in a sole document. The current version of the GASP is posted on the ICAO web site (www.icao.int/icao/en/anb).

1.3 ICAO's role within the GASP includes fostering several safety activities worldwide such as facilitating the communication of safety-related information and experience between governments and aeronautical industry, and endeavoring to ensure that the various safety programmes being undertaken worldwide are complementary rather than competitive, and that they address regional as well as global aviation safety concerns in a complete, integral and systematic manner.

1.4 The ICAO scheduled and on-going safety-related activities under the GASP, considered to have the best potential to reduce the number of accidents that result in major loss of life worldwide include:

- Ongoing work on CFIT and approach and landing accident reduction, including the development of aircraft equipment, operating procedures and training;
- Establish new requirements for airborne collision avoidance systems (ACAS) with emphasis on correct operating procedures;
- Introduction of ATM and aerodrome safety management systems;
- Introduction of human factors considerations into ICAO provisions;
- Continue updating of ICAO SARPs, PANS and guidance material;
- Completion of the first cycle of audits of Annexes 1, 6 and 8 as well as the expansion of audits to Annexes 11, 13 and 14 under the Safety Oversight Audit Programme (SOAP);
- Establish a runway safety/incursion education and awareness campaign; and
- Establish a minimum proficiency requirement for language use in radiotelephony communication.

1.5 Annex 11, describes safety as the primary objective of air traffic services (ATS), seeking to ensure the safe, orderly and timely flow of air traffic; and that, when applicable, the safety levels and objectives shall be established on the basis of regional air navigation agreements.

1.6 Likewise Doc. 4444, PANS-ATM expresses the objectives of safety management as ensuring that the established level of safety applicable to the provision of ATS within an airspace or at an aerodrome is met, and that safety-related enhancements are implemented wherever necessary. The provisions relating to implementation of systematic safety management and programmes with levels and objectives of Annex 11 and PANS-ATM are effective since 27 November 2003.

1.7 Likewise, the Eleventh Air Navigation Conference recommended the publication of the ATM Operational Concept Manual, to help the transparent and harmonized regional planning in line with the Global Plan for CNS/ATM Systems. During this conference, the *ATM operational concept* and *Manual on Safety Management for Aerodromes and Air Traffic Services* were presented.

1.8 The ATM operational concept proposes the establishment of a global framework for the assessment and management of safety in order to achieve a seamless approach in line with the objectives of the GASP, in order to ensure that all the safety-related activities be held in an integral manner towards year 2025 or beyond. To that end, it adopts a safety approach for all the ATM system, in which each element of the system shall be the subject of a safety analysis as an individual element, and as a component that interacts with others as part of a larger system, as indicated in the following definition:

System safety approach. A systematic and explicit approach defining all activities and resources (people, organizations, policies, procedures, time spans, milestones, etc.) devoted to the management of safety. This approach starts before the fact, is documented, planned and explicitly supported by documented organizational policies and procedures endorsed by the highest executive levels. The system safety approach uses systems theory, systems engineering and management tools to manage risk formally, in an integrated manner across all organizational levels, across all disciplines and all system life cycle phases.

1.9 The *Manual on Safety Management for Aerodromes and Air Traffic Services* covers the basic principles of safety management, such as:

- factors affecting system safety, with a particular emphasis on human error;
- the importance of organizational issues, including responsibility and accountability for safety performance, and the need for a positive safety culture;
- the responsibilities of the State regulator, and the need to separate the responsibilities of safety linked to the regulatory function and the ATS provision function;
- safety assessment procedures; and
- assuring the on-going safety of the system through audits and monitoring.

1.10 The objective of this Manual is to help States/Territories/International Organizations in the implementation of the provisions of Annex 11, Section 2.26 and Chapter 2 of the PANS-ATM, providing guidance for the implementation of a safety management system and an introduction to the related duties and organizational support requirements, highlighting the application of ATS safety management techniques.

2. Analysis

2.1 Day by day, safety management is held by ATS providers, whether from public corporations or private, which are not under the direct administration of the State. Nevertheless, the State, as signatory of the Chicago Convention, is responsible for the implementation of ICAO SARPs within the airspace and aerodromes under its responsibility.

2.2 In order to delegate this responsibility concerning ATS safety management provision, it is firstly required that States regulate the required provisions so that the ATS provider may implement systematic safety management practices and procedures to establish the suitable surveillance mechanisms to ensure that the ATS service providers comply with these aeronautical regulations requirements and will achieve an acceptable level of safety in operations.

2.3 The formal system and safety practices are normally referred to, in a collective manner, a safety management system. Therefore, every State safety management programme has two elements; the basic element of direct responsibility of the State to regulate and watch safety aspects, and the active element of ATS safety management, implemented through ATS providers.

2.4 Although the regulatory function and ATS provision are both under the direct administration of an organism (civil aviation department or a State-controlled authority), it is important to keep a clear distinction between these two functions.

2.5 Most of the activities that we undertake in our daily lives involve some degree of risk. We regard a particular activity as “safe” when we assess the risk to be acceptably small. This is true of all forms of human endeavor. While the complete elimination of accidents would be desirable, it must be recognized that such “perfect safety” is an unachievable goal; failures and errors will eventually occur, in spite of the best efforts to avoid them.

2.6 As long as risk may not be completely eliminated, the goal of aviation safety programmes should be to control the processes which could lead to hazardous events, in order to minimize the probability of accidents. Therefore, it is essential to implement a safety management programme to face the risks of the general aeronautical system.

2.7 A good safety behavior in the past is no guarantee of keeping accident-free in the future, particularly where in a larger number of accidents the ATS system is a contributory factor. An effective ATS safety management programme should adopt a proactive approach, incorporating procedures to:

- identify deviations that may lead to an accident before it happens;
- estimate in advance the risk of accident occurrence; and
- implement mitigating measures to reduce risk, where acceptable levels of risk have already been identified.

2.8 The implementation of a safety management programme requires the definition of performance objectives and the establishment of mechanism that permit demonstrates that these objectives are met. To that end, a framework should address issues such as:

- a) harmonization of safety indicators to be used across the aviation system, with particular emphasis on the development of predictive or “leading” indicators in addition to those which express the achieved level of safety;
- b) the setting of safety targets for the system as a whole;
- c) guidelines for determining the acceptable level of safety for system components and appropriate metrics for expressing this;
- d) guidelines concerning the way in which accountability for safety should be addressed within an organization and the need for documentation of safety-related decisions;
- e) suitable mechanisms for monitoring of safety indicators and ensuring that there are formal feedback learning/control loops, such as the universal safety oversight audit programme (USOAP), to ensure that mitigation measures are implemented in areas where safety concerns are identified; and
- f) programmes so that all organizations develop a positive safety culture, recognizing that accidents result not just from the mere coincidental occurrence of multiple undefended failures, but also from the migration of organizations toward unsafe behavior.

3. Conclusion

3.1 There is already a significant degree of interdependence between ground-based and airborne components in the current air traffic management systems, and it is expected that this interdependence would become even more significant in future systems.

3.2 With the increasing significance of air transport to the world economy, and the increasing costs of operating aircraft, there is also a need to ensure that the ATS system is as efficient as possible. The expression “ATS system” may be seen as the totality of the hardware, software and personnel required to operate the system, together with the standards and procedures, which govern its operation.

3.3 To improve safety in the E/CAR, it is necessary that States/Territories/International Organizations continue to participate more actively in activities organized by ICAO within the GASP, in order to introduce improvements to the safety systems through the implementation of ATS safety management programmes in coordination with the ICAO NACC Regional Office.

3.4 In view of all the above, it is necessary that the Meeting recommends the States/Territories/International Organizations to increase their efforts towards the implementation of safety management programmes. In this regard, the Meeting should bear in mind the paragraphs above.

4 Suggested action

4.1 The Meeting is invited to approve the following:

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CONCLUSION 28/X

IMPLEMENTATION OF ATS SAFETY MANAGEMENT PROGRAMMES AND MINIMUM SAFETY LEVELS

That the E/CAR States/Territories/International Organizations:

- a) develop an action plan to implement by **31 August 2005** ATS safety management programmes, in coordination with the ICAO NACC and SAM Regional Offices, through systematic and suitable programmes with the aim of ensuring safety in the provision of ATS within the airspace and aerodromes under their jurisdiction;
- b) establish in those programmes the objectives and minimum acceptable levels; and
- c) submit to the ICAO NACC Regional Office the ATS safety management programmes applicable to their airspace and aerodromes of jurisdiction.