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Agenda Item 1: Safety Management Issues
1.3 SSP and SMS Implementation activities and Progress Status

ICAO SMS/SSP EVOLUTION AND CURRENT STATUS

(Presented by the Secretariat)

SUMMARY

The evolution of safety concepts and subsequent implementation of Safety Management Systems (SMS) and State Safety Programmes (SSP) present singular challenges to the industry as well as to the regulators. This paper provides a perspective on the evolution, challenges and a few implementation issues that must be overcome as the migration process to the SMS/SSP environment is completed

References:

- *Safety Management Manual (SMM)* (Doc 9859)

Strategic Objectives	*This working paper is related to Strategic Objective A2.*

1. Background

1.1 From its aviation infancy the concept of safety has followed an evolutionary path. During its early days, aviation was typically a developing technology without a proper oversight or structured approach aimed at maintaining acceptable safety levels. It was then believed that safety could be guaranteed as long as certain rules and regulations were put in place and subsequently followed.

1.2 In later years, as aviation matured and the concept of safety evolved, accident investigation became a valuable tool in helping to determine the cause of accidents with the aim of reducing their frequency. Although this reactive method for improving safety was shown to be effective, there was still a need for a method or system that would help identify latent conditions to accidents before they actually occurred. Thus, the concept of management of safety was conceived.

1.3 In order to support the implementation of this new approach to the management of safety, the ICAO Safety Management Systems (SMS) Programme was launched in 2004. To further assist States and their service providers with the implementation of SMS, ICAO developed training courses related to the implementation of SMS. In this context, the *Safety Management Manual(SMM)* (Doc 9859) was also developed and first published in 2006. The second edition of this manual was published in March 2009 and is currently available through the following website www.icao.int/anb/safetymanagement.

2. ICAO Safety Management Standards and Recommended Practices (SARPS)

2.1 The ICAO safety management SARPs address three distinct requirements:

a) requirements regarding the State Safety Programme (SSP), and an associated acceptable level of safety (ALoS) of the SSP;

b) requirements regarding Safety Management Systems (SMS), including the safety performance of an SMS; and

c) requirements regarding management accountability.

2.2 Affected Annexes are Annex 1 — *Personnel Licensing*, Annex 6 — *Operation of Aircraft*, Part I — *International Commercial Air Transport — Aeroplanes* and Part III — *International Operations — Helicopters*, Annex 8 — *Airworthiness of Aircraft*, Annex 11 — *Air Traffic Services*, Annex 13 — *Aircraft Accident and Incident Investigation* and Annex 14 — *Aerodromes*, Volume I — *Aerodrome Design and Operations*, and they require the establishment of an SSP and that an acceptable level of safety (ALoS) to be achieved by the SSP be established by the State. In addition, Annexes 1, 6, 8, 11 and 14 state that States shall require, as part of their SSP, the establishment of an SMS by:

a) approved training organizations that are exposed to safety risks during the provision of their services;

b) aircraft operators;

c) approved aircraft maintenance organizations;

d) organizations responsible for type design and/or manufacture of aircraft;

e) air traffic service providers; and

f) certified aerodromes.

2.3 A cross reference of the affected Annexes and effective dates for implementation of the various safety management provisions is presented in the **Appendix** to this working paper.

3. ICAO Safety Management Systems (SMS)

3.1 An SMS is a management tool for the management of safety by an organization. The ICAO Safety Management SARPs also establish that the SMS shall be accepted by the State and shall, as a minimum:

a) identify safety hazards;

b) ensure the implementation of remedial action necessary to maintain agreed safety performance;

c) provide for continuous monitoring and regular assessment of the safety performance; and

d) aim at continuous improvement of the overall performance of the safety management system.

3.2 The four processes listed above constitute the core activities aimed at making continuous improvements to the overall level of safety.

4. ICAO State Safety Programme (SSP)

4.1 It is a basic premise that Service providers' SMS cannot work in isolation. In order for service providers to be fully successful in the implementation of their SMS programmes, they require an enabler on the part of the State to properly implement their activities. That enabler is the State Safety Programme (SSP). The SSP is a managerial system for the management of safety within a State. It provides an enabling platform for a State and its various civil aviation organizations to apply two basic safety management principles to the discharge of their safety responsibilities: safety risk management (SRM) and safety assurance (SA). The SSP also provides a structural framework that allows the State safety oversight authority and service providers within the State to more effectively interact in the resolution of safety concerns.

4.2 A critical concept within the SSP is that of the Acceptable Level of Safety (ALoS) as an essential ingredient for the effective operation of an SSP. The introduction of the notion of ALoS responds to the need to complement the historical approach to the management of safety based upon regulatory compliance, with a performance-based approach. Unless the notion of ALoS is understood and properly developed and implemented, progress toward a performance-based regulatory environment will be difficult to achieve. In this context, an effective relationship between the safety performance of an SMS and the ALoS of an SSP has to be clearly defined and clearly established.

5. Data Collection and Management

5.1 An important basis for all activity related to the management of safety is the collection of safety information. This means that the establishment of databases for analysis in order to effectively carry out SMS/SSP functions is a critical step in the process of implementation.

5.2 In this context, a very important function of ICAO is the analysis of safety data, including facilitating safety data exchange among its Contracting States. Until now, the safety data analysis needs of ICAO have been mostly single-source and mono-dimensional, i.e., analysis of accident and incident data. Under the SMS/SSP concept there is now a requirement to develop the means for convergence of relevant data from multiple databases to a common point, to allow for multi-source and multi-dimensional safety data analysis.

5.3 In support of this effort, another important function of ICAO is the development of safety programmes in response to emerging hazards and safety concerns. The safety programme development by ICAO is based on information derived from reactive and proactive identification of systemic deficiencies, and/or information derived from directed studies. Currently there are two projects being advanced by ICAO in this regard:

a) the Integrated Safety Data Collection and Analysis System (ISDCAS), and

b) the Comprehensive Runway Safety Programme

5.3.1 Integrated Safety Data Collection and Analysis System (ISDCAS)

5.3.1.1 The first project aims at developing a web-enabled tool, the Integrated Safety Data Collection and Analysis System (ISDCAS) which, through the confluence of multiple data sources available to ICAO, will allow for the development of robust analytic processes to support safety risk-based identification of safety concerns and prioritization of action plans in response to safety concerns.

5.3.1.2 ISDCAS will also allow to assess progress of actions plans in response to safety concerns; and support the development of key safety performance indicators to track the implementation of results regarding achievement of relevant Strategic Objectives of the Organization reflected in the Business Plan. A governance framework for the above will also be developed.

5.3.2 The Comprehensive Runway Safety Programme

5.3.2.1 This project has been divided into three distinct, yet inter-related areas, described below. All three areas are to be developed and delivered at the end of the project.

a) conduct a directed study to identify systemic safety vulnerabilities in runway operations;

b) conduct a gap analysis of safety regulation regarding runway safety, and runway safety materials and programmes sources available to ICAO; and

c) define the requirements for a range of runway safety mitigation strategies and safety enhancements.

6. Future Challenges

6.1 The implementation of an effective SSP by States requires a concentrated, structured, specific plan in order to be effective. As it is known, ICAO has developed an SSP framework made up of four components and eleven elements to assist States in the implementation of the SSP. The implementation of some of the elements may be challenging and will require special efforts.

6.2 One of those challenges is how States should develop regulations as safety risk controls as opposed to just administrative controls which has been customary practice. This new approach requires that the process of rule-making be carried out utilizing risk management principles.

6.3 Traditionally, oversight authorities have performed inspections based on prescriptive elements and strict compliance with those requirements. Under the new SMS/SSP concept, the nature of regulations will be one where as prescriptive elements are maintained, the addition of performance-based compliance is fostered in order to meet ALoS goals supported by safety performance goals of the various service providers SMS. This mind-shift on the part of how the oversight work of the authorities is carried out will require dedicated training not only on the part of the State's staff but also in personnel from the various aviation organizations in each State.

6.4 Two key components in ensuring success in the establishment of effective SSPs and SMSs, are the requirements to establish an acceptable level of safety (ALoS) at the State level and of a safety performance at the individual service provider level. These two elements form the backbone upon which effective safety management is built. Clear definitions of these two elements and their interaction will also play a critical role in defining the success or failure of the SMS/SSP efforts.

6.5 An effective State measurement strategy ideally should be made up of several levels or goals rather than a single one. The reason for this is that aviation activities even within a single service provider or regulator typically cover several different areas, each of which may have its own goal or acceptable level of safety or safety performance level. In addition, and in order to accurately gauge the ongoing status of the levels of safety performance, meaningful indicators need to be established and agreed upon between the authority and the service providers.

7. Conclusion

7.1 As it may be surmised from the foregoing, safety management is a continually evolving process within which constant adjustments to supporting programs and efforts need to be made. ICAO is providing support to contracting States in their SMS/SSP implementation plans which greatly facilitates their efforts in this regard.

7.2 In a similar fashion, States that have not already done so may wish to consider, at the earliest possible opportunity, to begin an SSP implementation plan. ICAO has a limited number of instructors available to provide technical cooperation upon State's request at a nominal cost. States desiring to take advantage of this offer or to obtain more information on this topic may contact the ICAO NACC Regional Office or visit the ICAO ISM website at: http://www.icao.int/anb/safetymanagement/

8. Suggested Action

8.1 The meeting is invited to:

a) note the information contained in this working paper;

b) urge States that have not already done so, to begin a SSP and SMS implementation activity at the earliest opportunity in order to comply with ICAO SARPs;

c) urge States that so desire, to request the ICAO NACC Regional Office to deliver a SSP implementation course for Civil Aviation Authorities' staff and/or SMS course for service providers; and

d) take any other action deemed necessary with regard to the implementation of SSP/SMS in the E/CAR region.

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APPENDIX

Safety Management SARPs for Service Providers			
Annex	Intended Audience	Denomination	Date Applicable
11	Air traffic services providers	Safety Management Programme	Nov, 2001
14	Certified Aerodromes	Safety Management Programme	Nov, 2001
2005 – Harmonization of Safety Management SARPs			
6, 11 and 14	A/C Operators & AMOs	SMS	Jan, 2009
2008 – 2nd Harmonization of Safety Management SARPs			
1	Training Organizations	SMS	Nov, 2010
8	Manufacturers	SMS	Nov, 2013
1, 6, 11, 14		SMS Framework	Nov, 2010

Safety Management SARPs for States			
Annex	States	Denomination	Date Applicable
2005 – Harmonization of Safety Management SARPs			
6, 11 and 14	States	Safety Programme	Nov, 2006
2008 – 2nd Harmonization of Safety Management SARPs			
1, 8 and 13	States	SSP	Nov, 2010
1, 6, 8, 11, 13, 14	States	SSP Framework	Nov, 2010

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