



ASSEMBLY — 37TH SESSION

TECHNICAL COMMISSION

Agenda Item 26: Safety management and safety data

THE EVOLUTION OF ICAO'S PROACTIVE SAFETY MANAGEMENT APPROACH

(Presented by the Council of ICAO)

EXECUTIVE SUMMARY

This working paper provides a progress report on ICAO's safety management activities necessary to assure achievement of global safety objectives through proactive mitigation of safety risks. This safety management strategy includes continued State Safety Programme (SSP) and Safety Management Systems (SMS) implementation as well as development of ICAO's internal safety data integration and analysis programme, intended to assist the Organization in its efforts to continuously improve aviation safety at a global level.

Consistent with safety management principles mandated for States and service providers, ICAO has begun to develop an internal integrated safety analysis system. Designated as the Integrated Safety Trend Analysis and Reporting System (iSTARS), ICAO's analysis tool is being developed to enable a coordinated, risk-based approach to safety initiatives conducted globally, as well as at the State and regional levels.

Action: The Assembly is invited to:

- a) agree on ICAO's strategy to further develop its integrated safety analysis system;
- b) agree on ICAO's role to facilitate development and definition of global safety metrics and associated data requirements, which are necessary for a harmonized global safety analysis system; and
- c) strongly encourage States to share with ICAO information related to their existing safety analysis systems, including classification of safety events, to facilitate harmonization of global safety analyses.

<i>Strategic Objectives:</i>	This working paper discusses the implementation and evolution of high-level tools used to implement the ICAO Strategic Objective on safety.
<i>Financial implications:</i>	Funding of these activities will need to come from a combination of potential saving related to productivity or efficiency gains within the Secretariat and voluntary contributions to the SAFE Fund.
<i>References:</i>	Doc 9935, <i>Report of the High-level Safety Conference 2010</i>

1. INTRODUCTION

1.1 Proactive safety risk management concepts are essential to ICAO's safety strategy and are consistent with State Safety Programme (SSP) and Safety Management Systems (SMS) requirements mandated for implementation by States and service providers respectively. As of November 2006, safety management Standards and Recommended Practices (SARPs) became applicable in Annex 6 — *Operation of Aircraft*, Annex 11 — *Air Traffic Services* and Annex 14 — *Aerodromes*. Subsequently, safety management SARPs were introduced in Annex 1 — *Personnel Licensing* and Annex 13 — *Aircraft Accident and Incident Investigation* and will become applicable as of November 2010. Safety management SARPs related to Annex 8 — *Airworthiness of Aircraft* are scheduled to become applicable in November 2013. The core objective of these safety risk management principles is to proactively identify hazards and mitigate the associated safety risks, thus leading to the reduction of global accident rates. Successful SSP and SMS implementation requires important organizational change, including the implementation and continuous operation of analysis systems capable of assessing safety risks, as well as the measures employed to mitigate unacceptable safety risks.

1.2 States and service providers must implement safety risk management (SRM) and safety assurance (SA) processes as key SSP and SMS components. Global implementation of safety management principles will depend on the coordinated conduct of safety analyses throughout the international aviation community. Accordingly, the successful transition to a predictive, data-driven approach to safety requires development of increased safety analysis capabilities for use by States and service providers, as well as ICAO, to accurately evaluate and monitor key safety trends. Therefore, ICAO has made a commitment to apply proactive safety risk management principles to its strategic safety decision making processes.

2. DISCUSSION

2.1 Safety management development and implementation

2.1.1 ICAO has supported the development of safety management practices and their implementation through SSP and SMS implementation training programmes and workshops. As of March 2010, ICAO had conducted thirty-eight SSP and 137 SMS training courses provided to representatives from 110 States, industry and international aviation organizations in an effort to create a common understanding of basic safety management concepts. ICAO will continue its training efforts, including implementation workshops intended to facilitate safety management efforts of both States and service providers. In addition, as an outcome of the High-level Safety Conference 2010, ICAO will proceed with development of a safety management Annex, providing regulators and safety practitioners across all aviation disciplines with a common safety management framework.

2.1.2 SSP and SMS both contain SRM and SA components, which require continuous analysis of various forms of safety data to enable analysis of predictive safety trends that are precursors to accidents and serious incidents. Therefore, continued SSP and SMS maturation will create new sources of information through the collection, archiving and analysis of data related to hazards that exist, in many instances as normal components, within the aviation system.

2.2 ICAO's safety analysis strategy

2.2.1 The objective of proactive safety analyses, whether conducted by ICAO, States or service providers, is the same: to provide decision makers with information capable of generating appropriate organizational responses necessary to proactively address elevated levels of safety risk.

2.2.2 A hierarchical strategy, as depicted in Illustration 1, will provide the means to determine and monitor strategic safety metrics through the conduct of multi-tiered analyses. Through this strategy, safety data collected and analyzed by service providers through their SMS processes will be transformed into State safety information through the SSP analyses. Various State safety information sources (e.g. air operations, aerodrome operations and air traffic management) will subsequently be analysed to monitor global safety metrics in support of strategic safety policies and objectives as determined by this Assembly. The hierarchy will result in coordinated analyses at multiple levels, enabling tactical decisions using safety data containing specific facts regarding hazards and occurrences, while simultaneously supporting strategic decisions through use of safety intelligence. In this manner, analysis output at each level will contain the appropriate amount of specificity, to assure resolution of safety issues without unnecessarily identifying individuals or organizations.



Illustration 1 – Safety Analysis Hierarchy

2.3 ICAO’s Integrated Safety Trend Analysis and Reporting System

2.3.1 Consistent with SMS and SSP principles, ICAO has made a commitment to develop an analysis system capable of monitoring global safety objectives through assessment of numerous criteria. The iSTARS is a safety risk-based decision making tool, having the capability to facilitate effective identification of hazards and resolution of unacceptable safety risks through analysis of multiple safety related factors.

2.3.2 iSTARS is designed to guide ICAO’s strategic decisions to achieve the safety targets of the Global Aviation Safety Plan (GASP). Given the complexity of today’s global air navigation system, integration of disparate types of data sources is essential to generate the accurate and comprehensive safety intelligence required to support strategic planning decisions. Therefore, analysis of diverse types of data is essential to accurately correlate multiple attributes that, in combination, have the potential to create systemic vulnerabilities that elevate safety risks.

2.3.3 A phased implementation process for iSTARS has been developed to assure achievement of ICAO’s safety analysis objectives. The initial phase, involving definition of the iSTARS operational concept and identification of comprehensive safety metrics has been completed. A prototype analysis system, based on the iSTARS concept and related data requirements, is currently operational and is undergoing evaluation. During this initial phase, the prototype is being used to integrate a limited number of internal ICAO data sources in order to assess various safety metrics. Initial evaluation of the safety

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analysis prototype has focused on the integration of data contained in the following internal ICAO sources:

- a) Accident / Incident Reporting (ADREP) system;
- b) Universal Safety Oversight Audit Programme (USOAP); and
- c) Integrated Statistical Database (ISDB).

2.3.4 Combined, the above sources provide the data necessary to correlate accident rates and implementation of USOAP protocols in States having various levels of aviation activity. Once the prototype evaluation is complete, ICAO will begin integration of additional data and various forms of safety information provided by both internal and external sources. As inclusion of additional data sources will expand the system's analysis capabilities and enhance the value of its output, the sharing of safety information from external entities will be instrumental to the continued development and expansion of iSTARS.

2.3.5 Nonetheless, successful integration of external information will require agreement among key stakeholders regarding the definition of safety metrics as well as alignment of analysis methods to ensure consistent assessments of global safety trends and benchmarks. Accordingly, ICAO's role in this regard will be essential to facilitate the integration of information used for this purpose.

2.3.6 As discussed, a significant increase in the amount of information available to support proactive safety analyses is anticipated due to continued SSP and SMS implementation. Safety management practices will create new sources of information through the collection, archiving and analysis of data related to hazards that exist within the aviation system. The integration of information regarding hazards that exist within the international aviation system, reactive safety data resulting from investigation of accidents and incidents as well as various forms of safety oversight data is essential to achieve future safety improvements.

3. CONCLUSION

3.1 Components contained within SSP and SMS will be essential to the proactive resolution of safety issues existing at the State, regional and global levels. Therefore, it is proposed that ICAO continue its role of facilitating the effective SSP and SMS development and implementation through delivery of associated training programmes and implementation workshops.

3.2 Implementation of future safety analysis systems is dependent upon harmonization of safety indicators used to assess safety metrics at State and regional levels. Therefore, it is proposed that ICAO coordinate the definition of safety metrics and identify related data requirements, as necessary, to derive actionable information for use in proactive mitigation of safety issues.

3.3 It is further proposed that States agree to provide the safety information required for ICAO to assume its role as the focal point to facilitate the integration of global safety information and the dissemination of resultant safety intelligence to the international community. In this role, ICAO will coordinate the synthesis of various types of information provided by multiple organizations in support of integrated safety analyses.