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Agenda Item 4: Safety Oversight Developments

U.S. APPROACH TO SAFETY MANAGEMENT SYSTEM (SMS) IMPLEMENTATION: COMMERCIAL AIR OPERATORS AND APPROVED MAINTENANCE ORGANIZATIONS

(Presented by the United States of America)

SUMMARY

The United States Federal Aviation Administration (FAA) fully endorses the ICAO initiative to implement safety management systems (SMSs) for commercial air operators and approved maintenance organizations in accordance with recently adopted amendments to Annex 6. The FAA believes in a systems approach to safety and the updated SMS requirements provide practical tools for systemic risk management. They also provide structured tools to meet requirements of existing U.S. legislation on the part of both government and industry. To this end, the FAA has already developed an air operator SMS standard, similar to the internationally recognized standards for quality, environmental protection, and occupational safety. The FAA is also developing additional guidance material, auditing tools, and training. Recent developments by FAA and ICAO take the SMS concept further into making it a comprehensive systems approach to safety management.

1. INTRODUCTION

1.1 The United States and many other nations enthusiastically endorsed the requirements for SMSs for commercial air operators and maintenance organizations that were added to Annex 6. We had already begun to explore the SMS concept, initially to provide a framework for system safety efforts for air operators late, in 2002. This effort was undertaken as a result of the FAA's experience with transitioning to system safety oversight methods, an effort on the part of the FAA's Flight Standards Service to implement a quality management system for the service, and growing acceptance of SMS and quality management methods in the air carrier industry. System safety cannot be achieved through oversight alone so SMS is viewed as a completion of the system safety circle of practices.

1.2 Since its initial development and proposal as an ICAO standard, acceptance of the SMS concept has grown. In a recent international safety forum sponsored by the FAA, acting FAA Administrator Bobby Sturgell stated: "The answer [to "raising the bar" on aviation safety] is SMS – safety management systems – and the challenger I'm here to issue today is for each of the people in this room to become activists for safety management systems. If your operation, or organization, or your nation doesn't have one in place or isn't moving toward developing one, that needs to change."

1.3 The FAA, along with ICAO, recognizes the need not only for a more systems-oriented approach to safety than has been practiced before, but also for a more managerial approach on the part of both government and industry. Moreover, notwithstanding the FAA's responsibility to promulgate regulations and standards, progress in aviation safety can be enhanced with a more integrated, cooperative relationship versus a legalistic, adversarial approach. Safety management is, therefore, more rightly viewed as a shared effort between government and industry.

1.4 The SMS will provide a more systemic, risk based approach to safety and take the processes of regulation and safety oversight out of the domain of simple administrative actions and into the realm of risk based safety management. In his address at the Safety Forum, acting Administrator Sturgell stated, "At its most fundamental level, a safety management system helps organizations identify and manage risk. It does not wait for something to happen. It doesn't rely on anecdotal information. It is based on hard data. Safety management systems help us manage risk far better then we have, because it's a disciplined and standardized approach to managing risk."

1.5 The FAA also intends to apply the SMS processes of safety risk management and safety assurance to its own activities. The FAA's Associate Administrator for Aviation Safety plans to infuse these processes into the processes of rulemaking, policy management, strategic planning, and targeting of oversight activities in the Aviation Safety organization, which is already ISO-9000 registered. This will not only allow better capabilities for continuous improvement, but will also facilitate the agency's ability to keep pace with the complex and dynamic system of systems that make up the modern air transportation system.

1.6 The most recent ICAO proposal affecting SMS provides frameworks not only for service providers' SMSs, but also for States' activities in a comprehensive State safety programme. This is consistent with the FAA's development of the "AVSSMS." The FAA agrees with ICAO that a comprehensive, collaborative approach to safety management with clearly defined roles for government and industry stakeholders is an important step forward for aviation safety.

2. DISCUSSION

2.1 Trends in management indicate that a structured approach to management, where clear goals and requirements are set and where management processes are put in place to assure attainment of these goals, is more reliably effective than by other means. The FAA is in the process of transitioning air carrier oversight to a completely systems-based approach, but both the agency and industry recognize that this transition will not be effective though regulator actions alone. System safety must be infused into the management systems of air operators and other service providers if it is to have the desired effect on safety outcomes.

2.2 The first of ICAO's eight critical elements of safety oversight concerns primary legislation, the statutory law that conveys responsibility and authority to the regulating agency. Title 49, US Code, Subtitle VII, Chapter 447, "Safety Regulation," serves this need in the United States. Section 44701 of this chapter lays out the following responsibilities for the FAA Administrator:

> "The Administrator of the Federal Aviation Administration shall promote safe flight of civil aircraft in air commerce by prescribing…regulations and minimum standards…" "The Administrator may prescribe minimum safety standards for an air carrier to whom a certificate is issued under section 44705 of this title…" "The Administrator shall carry out this chapter in a way that best tends to reduce or eliminate the possibility or recurrence of accidents in air transportation."

2.3 Particularly in the most recent decade, the FAA has moved increasingly toward a process-oriented systems approach for safety oversight as a means of more effectively meeting the agency's responsibilities. Along with this, the FAA has encouraged holders and applicants of Air Operator Certificates (AOCs) to incorporate the FAA's methods and tools in their own safety efforts.

2.4 U. S. legislation also lays out the responsibility of AOC holders. Section 44702 of the code places the following responsibility on holders of AOCs:

> "When issuing a certificate under this part, the Administrator shall consider the duty of an air carrier to provide service with the highest possible degree of safety in the public interest and the differences between air transportation and other air commerce…"

2.5 This statement provides one of the fundamental underpinnings for the system of safety regulations that apply to air operators. Additionally, the code enables the FAA to issue AOCs after making the following determination (section 44705):

> "The Administrator of the Federal Aviation Administration shall issue an air carrier operating certificate to a person desiring to operate as an air carrier when the Administrator finds, after investigation, that the person properly and adequately is equipped and able to operate safely under this part and regulations and standards prescribed under this part."

2.6 Therefore, given the responsibilities of AOC holders with respect to safety and the statutory and regulatory requirements necessary to achieve certification, the next most logical step is for AOC holders to develop and implement structured safety management systems to meet their requirements. Moreover, this gives the FAA, as regulator, a structured process with which to interface with the operator on safety management matters.

2.7 On June 22, 2006, the FAA issued Advisory Circular (AC) 120-92, Introduction to Safety Management Systems for Air Operators. The AC provides background and introductory material on SMS processes and interfaces between the operator's SMS and the FAA oversight system. An appendix to this document delivers an SMS standard for use by air operators of all sizes and types. The remainder of the document supplies information to introduce the standard and to give rationale for its clauses. A second appendix to the AC provides a cross reference between the SMS standard and standards for quality, as well as environmental and occupational health and safety management systems. Work is also progressing to produce a universal SMS standard for both internal (FAA) and all external (service provider) safety management systems.

2.8 At the time that the FAA began considering development of SMS standards and implementation by U.S. airlines, several other countries had already developed material on the subject, as had the Air Line Pilots Association (ALPA) and several U.S. airlines. Many other innovative quality management and system safety efforts were also in play that employed many of the concepts seen in a typical SMS. It was clear at the outset that the objective system would benefit from conceptual commonality and harmonization with other existing systems. After a detailed analysis of these systems, the development team settled on the four "pillars" outlined below. Below this level, the standard was organized according to the general scope, scale, and content of ISO 9000 and ISO 14001.

2.9 The FAA is also developing SMS guidance for use by aviation maintenance organizations and another for use by training establishments. To support the standards, a series of guidebooks are also being developed. These guidebooks establish functional objectives for each major subclause of the standards, include a citation of the relevant section of the standard, and provide guidance for development of the function. These guidebooks follow the general format of ISO-9004. A series of auditing tools are also being developed, also derived from the standard's requirements. In this way standards, guidance and advisory material, and auditing tools flow between each other in a systematic fashion.

2.10 The FAA SMS standard, as outlined in the SMS AC, is organized around four components or "pillars": policy, safety risk management, safety assurance, and safety promotion. Of the four components, safety risk management and safety assurance provide the functional core of the SMS. The policy component provides for overall management control, while the safety promotion component sets up the framework for a sound safety culture.

a) Policy-- Effective safety management must begin with policies that convey top management's emphasis on safety and their objectives for the organization's members. These policies include assignment of responsibility and authority throughout the organization with respect to safety-related functions of all employees. Policies must also be translated into clear procedures to provide instructions for accomplishment of safety-related functions as well as organizational controls to ensure that these functions perform as designed.

b) Safety Risk Management (SRM)-- The fundamental objective of any safety program is to identify hazards, to analyze and assess associated risks, and to design and implement controls on those hazards and risk factors. SRM is thus a design activity. Its intent is to design risk control into the operator's way of doing business. The safety risk management (SRM) pillar in the FAA's SMS standard for air operators is based upon a model that is used in several popular system safety training courses, including the course taught at the FAA Academy. The FAA's SMS standard starts with a careful analysis of the organization's systems and goes on to provide structured processes that result in the development of risk controls. The principal steps in the SRM process include:

1) System/Task Analysis.

2) Hazard Identification.

3) Risk Analysis.

4) Risk Assessment.

5) Risk Control.

c) Safety Assurance (SA)-- The risk controls developed under the SRM pillar now become organizational system requirements. The safety assurance pillar then takes these requirements and applies quality management techniques to the process of ensuring that these controls are being correctly implemented and that they are producing the desired results. By this methodology, the performance and effectiveness of the risk controls that were designed in the SRM step are assured.

d) The group that developed the standard recognized that airlines are really "systems of systems." There are the technical systems that make up flight operations, ground operations, maintenance and training, as well as other management systems that must be in place for the business enterprise to run. Moreover, these businesses must also manage other areas of health and safety such as occupational safety and health management systems and environmental management systems. While the focus of the SMS is on safety, the standard was drafted in full recognition of the need for airline companies to balance requirements and to make them fit together with minimal duplication of effort.

e) Safety Promotion (SP)-- The fourth pillar was developed with recognition of the importance of a sound safety culture in the safety management process. Employee knowledge, involvement, and motivation are crucial to safety management success. The safety management pillar stresses training and awareness, communication, and active participation. It also sets the groundwork for support of a "just culture" in which employees are encouraged to report safety deficiencies and feel confident that their management will be fair and responsive. The safety promotion pillar is also closely integrated with the SRM and SA pillars as an important source of information for both.

2.11 The SMS standard was also developed in recognition of various safety program components that already exist separately. The concept of the SMS is to provide a framework for integration of all of the government and industry programs into a comprehensive system. These programs include Flight Operations Quality Assurance (FOQA), Aviation Safety Action Program (ASAP), Internal Evaluation Programs (IEP), and the Voluntary Disclosure and Reporting Program. Most of these programs are treated as options within the SMS, but current and future efforts will be directed toward more seamless integration.

2.12 The FAA began a movement to a more systems-oriented method of oversight in 1998 with the advent of the Air Transportation Oversight System (ATOS). Since then, the agency has encouraged operators to use the same tools that are used by FAA inspectors to design and evaluate organizational systems. The FAA also believes that safety is most effectively achieved though an open, collaborative approach wherein information moves freely, not only inside both the oversight system and the airline, but also between them.

2.13 Recently, ATOS was updated to more clearly reflect a safety assurance strategy that stresses assessments of organizational design, followed by assessments of the performance and effectiveness of designed-in risk controls. This closely parallels the safety risk management (design) and safety assurance (performance and effectiveness) processes of the operator's SMS. Moreover, it gives a more systems-based underpinning to the ICAO critical elements of oversight of certification (design – safety risk management) and surveillance (performance/effectiveness – safety assurance). The FAA's safety program is thus given an integrated systems-based architecture where information can smoothly flow between the operator's processes and those of the oversight organization.

2.14 The AVSSMS will apply the same four components to FAA activities, as proposed in ICAO's recent state letter. It will also incorporate all of the traditional elements of oversight into this framework. For example, if safety risk management concepts are applied to rulemaking (ICAO Critical Element of Oversight – CE number 2), then regulations, when properly applied and complied with, become safety risk controls. Likewise, the performance and effectiveness of these controls will be assured though structured safety assurance processes. Thus the AVSSMS will apply SMS concepts to development and management of oversight functions (CE-3), assessment of service providers' risk controls (CE-6 – licensing and certification), collection of data with which to make data-driven safety assessments (CE-7) and targeted resolution of problems (CE-8) either through traditional corrective actions or repeated application of the safety risk management process to redesign risk controls.

2.15 The FAA has also begun a rulemaking effort in support of SMS. A team of technical specialists was assigned to this task in November, 2006 to consider requirements associated with Annex 6. More recently, this effort has been expanded to provide a single SMS regulation, applying to most types of certificated aviation organizations in the United States. This approach is envisioned to ensure standardization of SMS requirements across aviation domains.

3. CONCLUSION

3.1 The advent of system safety, the managerial approach and the more open, shared environment of the SMS presents many new challenges for all participants in both industry and government. This will entail a major cultural shift for many players. Understanding of new concepts will be crucial as will be the attainment of necessary skills for the new and revised processes. For this reason, the FAA plans to make considerable investments in training and change management efforts as well as continued developments in oversight systems for air operators and maintenance organizations. FAA is also reaching out to members of industry, sharing information to mutual benefit. These industry organizations are also investing in SMS developments. However, we feel that this is an extremely worthwhile investment that should reap benefits for both parties.

4. ACTION BY THE CONFERENCE

4.1 The Conference is invited to:

i) Note the contents of this paper, and

ii) Urge States in the Latin America region to implement these new SMS- related provisions in Annex 6.

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