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Agenda Item 5: 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 currently planning several proof of concept trials to further develop SMS concepts and implementation methods and is in the process of reviewing existing regulations, standards, and policy documents to determine if changes will be necessary and, if so, to base those changes on results of the proof of concept trials. Recommended action by the meeting is proposed in paragraph 4.

1.0 INTRODUCTION

1.1 Earlier this year, the ICAO Council adopted amendments to Annex 6, Parts I and III, requiring States, *inter alia*, to require commercial air operators and maintenance organizations to have [or use/develop/file] Safety Management Systems (SMSs). One aim of this amendment was to harmonize these new Annex 6 provisions with the comparable SMS provisions in Annexes 11 and 14, initially adopted in 2001, but also altered earlier this year, for better standardization by establishing common concepts and practices in these 3 annexes.

1.2 The United States and many other nations enthusiastically endorsed the concept of SMSs for commercial air operators and maintenance organizations. Research work 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.

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 the legalistic, adversarial approach. Safety management is, therefore, more rightly viewed as a shared effort between government and industry.

2.0 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 Over the past 10 years, 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 [not clear why the rest of this quote is here?] 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 The FAA also intends to apply the SMS approach to safety risk management and safety assurance to its own activities. The Office of the Associate Administrator for Safety (AVS), as an ISO-9000 registered organization, plans to infuse these SMS methodologies into the FAA's rulemaking, policy management, strategic planning, and targeting of oversight activities processes. 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.

2.8 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.

2.9 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.

2.10 The foundation of a healthy safety culture is supported through well-designed operational procedures that are cross-functionally harmonized and then fully engrained into employee behaviors using a robust employee training program. This is clearly a responsibility of the management team and its policies. The safety risk management and safety assurance processes convert these policies into procedures with embedded risk controls. However, the conduct of operational activities in a safe manner rests on the shoulders of the employees as they perform technical and service-related tasks. The SMS must, therefore, ensure that organizational structural elements exist to support a sound safety culture.

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

a) <u>Policy</u>. 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) <u>Safety Risk Management</u>. The fundamental objective of any safety program is to identify hazards, to analyze and assess associated risk, and to design and implement controls on those hazards and risk factors. 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) <u>Safety Assurance</u>. 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.

[confusing to have a thru e, but only 4 pillars.] 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 minimumal duplication of effort.

d) <u>Safety Promotion</u>. 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, being an important source of information for both.

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 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.

3.0 CONCLUSION

3.1 The FAA has already begun to examine existing regulations, standards, and policies and is in the process of formulating a strategy to meet the Annex 6 deadline of January 1, 2009, for air operator SMS requirements. This work will identify any changes to existing regulations or guidance documents that may be needed for SMS implementation. As with other regulatory development, the effort will include representatives of operators, industry advocacy organizations, and organized labor in further discussions.

3.2 In 2008, the FAA intends to initiate a series of proof of concept trials involving voluntary SMSs with a small number of different sizes and types of air operators and other service providers. These trials will employ the SMS standard already developed and will be targeted toward development of implementation procedures, more detailed guidance materials, and improvements to the standard itself. Data will be collected and shared between all of the participants as well as the industry in general. The proof of concept trials will enable both industry and government organizations to gain valuable experience that can be applied to the process of developing better requirements and implementation strategies.

3.3 The Flight Standards Service of the FAA is currently studying methodologies for implementation. At present, a phased implementation is favored where the four pillars and their underlying functions can be modularized and implemented module by module. Also, a maturity model is under development wherein the modules may be implemented first with only the most rudimentary documentation and structure and then incrementally developed until full capabilities are achieved. This model has proven useful in several other industries. Experience has also shown that many aviation organizations, while having sound sets of practices, often display a lack of documentation. A modular approach based on a maturity model also allows organizations to set goals and milestones that allow them to grow their systems in an orderly fashion. The proof of concept trials will be used to determine an optimal implementation strategy.

3.4 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 is crucial as is the attainment of necessary skills for the new and revised processes. The FAA is, therefore, also beginning to develop training and outreach plans for both FAA and industry participants as part of its safety promotion efforts. Several organizations, including the FAA Academy, are involved in these developments.

4.0 **RECOMMENDATIONS**

- 4.1 The meeting is invited to:
 - i) note the contents of this paper, and
 - ii) urge States in this region to fully comply with these new SMS-related provisions in Annex 6.