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DIRECTORS GENERAL OF CIVIL AVIATION CONFERENCE ON A GLOBAL STRATEGY FOR AVIATION SAFETY

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Theme 2: Improving aviation safety
Topic 2.2: Management of aviation safety

SAFETY MANAGEMENT SYSTEM CONCEPT

(Presented by the United States)

SUMMARY

This paper outlines the Federal Aviation Administration (FAA) Safety Management System (SMS) Standard for aviation product and service providers. It highlights the key attributes of an SMS, and discusses the relationships between the regulator, service provider and the International Organization for Standardization (ISO), Quality Management Systems.

Action by the Conference is in paragraph 4.

1. INTRODUCTION

1.1 The Federal Aviation Administration (FAA) has completed a Safety Management System (SMS) Standard for aviation product and service providers. The Standard outlines the key attributes of an SMS and establishes SMS requirements. It is FAA's intent to impose this standard on organizations it oversees including aircraft operators, aircraft manufacturers, and the FAA Air Traffic Organization (ATO), the United States air navigation service provider.

1.2 This paper provides an overview of FAA's SMS standard**,** its impact on the relationship between oversight and service provider entities, and its relationship to quality management systems standards such as the International Organization for Standardization's ISO-9000.

2. DISCUSSION

2.1 At its most fundamental level, an SMS is a structured way of managing the things that can go wrong in a system, organization, or operation. SMS integrates what is done today with emerging capabilities in safety risk management.

2.2 FAA's SMS standard specifies that SMS is an integrated collection of processes, procedures, policies, and programs that are used to identify, assess, define, and manage safety risk. It also specifies that there are two primary means of identifying hazards. One method is to collect data from past incidents or safety occurrences and use the information gathered to identify hazards. The other method is predictive, using our knowledge of systems to make hypotheses regarding the things that can go wrong. The standard integrates both of these methods into a seamless system that addresses both proactive and reactive determinations of hazards; seeks out existing and future hazards within the current system - in addition to predicting risk associated with changes to the system; provides information and processes to guide our decisions; focuses our scarce resources on the highest risk areas; and, verifies the means of controlling safety risk.

2.3 The standard addresses the four major elements of the SMS:

a) **Safety Policy** — The SMS requirements, responsibilities, and accountabilities for system functions;

b) **Safety Risk Management —** The procedures used to identify hazards, assess current and future safety risk of the system or operation, manage the safety risk, document the mitigations selected to manage the safety risk, and verify and monitor the mitigations throughout its lifecycle;

c) **Safety Assurance** — The processes used to assure safety of the product or service provider's system, including audits, evaluations and inspections, as well as data tracking and analysis; and

d) **Safety Promotion —** Training, communication, and dissemination of safety information to strengthen the safety culture and support integration of the SMS into operations.

2.4 These four elements work synergistically to focus resources, develop and implement safety risk mitigation strategies and implement safety requirements.

2.5 The standard provides for an implementation strategy that builds on existing operational policies, processes, and procedures and introduces new integrated elements to bring about a systems approach to managing the safety risk. For systems that are currently in operation, the implementation does not start anew. For instance, the air traffic service provided by the FAA has decades of exemplary safety performance. Safety management systems within the various stakeholder organizations, such as the FAA ATO, air carriers, aircraft and aircraft parts manufacturers, etc., will build upon the processes that caused this exemplary safety record to be possible. Ultimately, these safety management systems will provide a common framework to assess and manage safety risks, allowing every stakeholder to speak the same language and provide a baseline for acceptable and unacceptable safety risk in the air transport system.

2.6 Successful implementation and operation of an SMS requires active senior management commitment and responsibility, as well as an overall "safety culture" in which everyone is aware of their

responsibility for safety and held accountable for the safety of those system elements within their purview.

Impact on Regulator/Service Provider Relationship

2.7 The existing legal context of regulator and service provider does not change with the implementation of SMS. However, regulation and oversight methods could change. In the SMS construct, the regulator sets the requirements for the service provider's SMS and also ensures that the requirements are met. Once an approved SMS is operational and functioning to the regulator's satisfaction, a risk-based methodology for review and oversight can be employed. No longer would the regulator need to oversee and test each of the products of the process; rather the process itself is overseen, and the actual outputs only sampled for process assurance. For instance, when certifying an aircraft, if the manufacturer has a functioning and mature SMS, the regulatory authority would ensure that the SMS processes were followed, rather than specify a test to fail the wing (testing the outcome). The onus is on the service provider to ensure the safety of the products and services it provides, whether it is aircraft, air traffic services, or air carrier operations.

2.8 In such instances, the service provider becomes responsible for primary safety quality assurance, which is the direct quality of the SMS and its products. The oversight organization can then focus on secondary quality assurance, or the quality of the service provider's primary safety quality assurance program. In the case of a less complete or immature SMS, the oversight organization could revert partially or completely to the classical role, i.e., in the referenced example above, specify and witness the wing failure test.

2.9 The benefits of a risk-based methodology are that resources are focused on those areas that are most safety critical. The service provider organization has more freedom to adjust to the dynamic environment of the air transportation system, while the regulator is able to better target its resources based on identified or emerging safety risks.

Relationship with the International Organization for Standardization-type Certification (ISO)

2.10 Many organizations in the air transportation system either have, or are working toward, ISO-type quality management system certification. The International Organization for Standardization (ISO) is the world's largest developer of standards. ISO-9000 is a framework for evolving an organization from an ad hoc, less organized, less effective state to a more highly structured and highly effective state. It provides the framework for the organization's quality management system. Use of a model such as ISO-9000 is a means for organizations to bring their practices under statistical process control to increase their process capability. Process improvement leads to high quality outcomes, which become measured and repeatable.

2.11 Although the principal activity of the ISO-9000 certification is to provide technical standards, the underlying benefits reach much farther than just standardization. Standards contribute to making the development, manufacturing, and supply of products and services more efficient, safer, and cleaner. They also provide customers (and regulators) assurance that the service provider has standard, documented, and repeatable processes.

2.12 Although ISO-9000 ensures that the product or service is provided in a standardized and repeatable way, SMS goes further to include processes designed to ensure the safety of the product or service.

3. CONCLUSION

3.1 It is FAA's intent to monitor the safety of all those entities it oversees including aircraft operators, aircraft manufacturers, and the ATO, through approved safety management systems that meet the standard outlined in this working paper.

3.2 In an environment of increasing aviation activity and decreasing resources, SMS is a perceptive data-driven approach that enables regulators to better target their resources on identified or emerging safety risks. Using a risk-based methodology, resources are focused on those areas that pose the greatest risk potential.

4. ACTION BY THE CONFERENCE

4.1 The Conference is invited to:

a) urge the ICAO Council to continue work towards the development of training, guidance material and other enabling tools to help Contracting States expedite the implementation of Safety Management Systems;

b) give consideration to the Safety Management Systems principles presented by the United States in this working paper.; and

c) urge ICAO Contracting States to encourage all those entities they oversee, including aircraft operators, aircraft manufacturers and service providers to implement Safety Management Systems as soon as possible.

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