



# Advisory Circular

**Subject:** Voluntary Implementation of Safety Management Systems (SMS)

**Date:** DRAFT 11/26/2007  
**Initiated by:** AFS-900

**AC No.:** XX-X  
**Change:**

## 1. PURPOSE.

a. This advisory circular (AC)—

(1) Provides a process for voluntary implementation of Safety Management System functional requirements described in AC 120-92, Appendix 1 by aviation service providers (air operators, aviation maintenance organizations, and flight training organizations).

(2) Provides a three-level award system to provide service providers with certificates of achievement to signify their accomplishments in SMS development and accomplishment:

(a) along the levels of a phased SMS maturity model

(b) in relation to international standards.

b. This AC is not mandatory and does not constitute a regulation. Development and implementation of an SMS is, therefore, voluntary. While the Federal Aviation Administration (FAA) encourages each aviation service provider to develop and implement an SMS, these systems in no way substitute for regulatory compliance of other certificate requirements, where applicable.

**2. APPLICABILITY.** This AC applies to both certificated and non-certificated air operators and aviation maintenance organizations that desire to develop and implement an SMS. An SMS is not currently required for U.S. certificate holders. However, the FAA views the requirements in appendix 1 to this AC to be a minimum standard for recognition of an SMS developed by an aviation service provider.

**3. REFERENCES.** The following references are recommended reading material for users of this AC in development and implementation of an SMS.

a. Order VS 8000.1 Safety Management System Doctrine

b. AC 120-92, Introduction to Safety Management Systems for Air Operators

- c. ICAO Document 9859, *Safety Management Manual (SMM)*
- d. International Standards and Recommended Practices: Annex 6 to the Convention on International Civil Aviation – Operation of Aircraft
- e. Guidebook for Developing a Safety Management System for Air Operators (Currently in development)
- f. Guidebook for Developing a Safety Management System for Aviation Maintenance Organizations (Currently in development)
- g. AC XX-XX Safety Management System Training (Currently in development)
- h. ISO 9000-2000 Quality Management Systems – Fundamentals and Vocabulary
- i. ISO 9001-2000 Quality Management Systems - Requirements

**4. BACKGROUND.** The Federal Aviation Administration (FAA) is engaged in a SMS rulemaking effort corresponding to changes made in ICAO Annex 6 as well as FAA internal system safety objectives. The FAA Associate Administrator for Safety issued Order VS 8000.1, Safety Management System Doctrine, in 2006. This document provides a broad framework for SMS implementation across the National Aviation System. At present, however, SMS implementation by aviation service providers is voluntary in the United States. The FAA has developed and published an SMS standard, similar in scope and format to the international ISO standards for Quality and Environmental Management Systems. This standard is published in Appendix 1 to AC 120-92. This standard was developed after extensive review and analysis of other countries' SMS programs as well as those of third party industry organizations and the safety, quality, and environmental management standards developed by a variety of organizations such as ISO, the British Standards Institute, Standards Australia, and the International Air Transportation Association. The FAA standard also incorporates the requirements of Annex 6 of the conventions of the International Civil Aviation Organization (ICAO). Moreover, the standard is closely aligned with the current ICAO SMS framework. This voluntary implementation process, therefore, provides aviation service providers with a means of implementing SMSs on a voluntary basis and to achieve FAA recognition for their efforts. Both ICAO and other governments that are in the process of implementing SMS requirements favor a phased implementation process. The SMS maturity model presented in this AC closely parallels the ICAO recommended phased implementation process.

**5. ROLES.** Participation in this SMS development is completely voluntary and may be terminated at any time. Participants will benefit by being an early adopter of a program that will be mandated in the near future.

**a. Aviation Service Providers .** The SMS standard in AC 120-92, Appendix 1 requires aviation service provider(s) to develop and document its SMS program in internal process documents. A separate SMS manual is not required. The SMS may be documented in a form and

manner that best serves the organizations needs. However, any modifications of existing FAA approved/accepted programs and their associated documents must be coordinated with the appropriate CHDO. The safety policies developed by top management will be clearly communicated to the entire organization. Safety promotion activities will take place to instill or reinforce a safety culture throughout the organization.

**b. Standardization and Assistance Team.** Selected FAA Headquarters and field personnel, or their assigned support organization, will form a Standardization and Assistance team to provide assistance, as requested, to the Service provider and its Oversight Organization throughout the SMS development period. This assistance will be limited to guidance related to the development and implementation of the SMS, and may include formal training sessions as required. Standardization and Assistance Team members will not be involved in oversight of the Service provider and will not perform inspections, audits or evaluations of the Service provider.

**c. Oversight Organization.** The FAA office (CMO, CHDO, FSDO, etc.) that normally provides oversight of the Service provider will be referred to as the Oversight Organization and will continue all of its normal oversight and certificate management duties. As Service providers develop their SMS, a natural interaction between the safety management efforts of the Oversight Organization and those of the Service provider also develops. This relationship can leverage the efforts of both parties to provide a more effective, efficient, and proactive approach to meeting safety requirements while at the same time increasing the flexibility of companies to tailor their safety management efforts to their individual business models. Therefore, in order to fully understand the Service provider's approach to SMS, it is important for the Oversight Organization to be fully engaged during the Service provider's development and implementation of its program. The SMS development will also provide the Oversight Organization with an opportunity to gain experience in oversight of the service provider's (Service provider as described elsewhere in this document) SMS, as well as, using SMS as a tool for interfacing with the service provider's management. The Oversight Organization will be responsible for participating in the development process meetings including gap analysis in-briefing and presentation of an implementation plan by the service provider. The Oversight Organization will also be responsible for reviewing the service provider's implementation plan and the accomplishment of each level of the SMS implementation.

**6. LIMITATIONS.** The SMS in no way substitutes for regulatory compliance of other certificate requirements, where applicable. There are no new regulatory programs introduced. The FAA is seeking to increase the use of current voluntary programs in the process of safety management, particularly use of the Aviation Safety Action Program (ASAP) and internal evaluation programs (IEP). Both of these programs have strong relationships to the functions of safety assurance and safety promotion in a SMS. Service providers are encouraged to consider integrating these programs, through existing processes, into a comprehensive approach to safety management.

Service providers and their employees should be aware that, at present, the SMS and/or participation in the SMS development can not provide enforcement "incentives" that are outside provisions of existing FAA programs (e.g. ASAP, VDRP, ASRS). Additionally, it should be

noted that certain aspects of the final SMS rule, if and when issued, may differ from those used in the voluntary implementation program. It is the objective of the Flight Standards Service to maintain the voluntary implementation and oversight processes in such a manner as to facilitate the smoothest transition from voluntary to required SMS programs, should they be required by regulations in the future.

**7. THE SMS MATURITY MODEL.** Initial implementation strategy will follow the four phases outlined in the ICAO SMS training course (as of September, 2007). The phases of implementation will be arranged in the format of a maturity model, similar to that developed as the Capability Maturity Matrix (CMM) by the Software Engineering Institute of Carnegie-Mellon University. This technique has also been employed by the U.K. Health and Safety Executive (HSE – equivalent to U.S. OSHA) as a safety culture maturity model. Figure 3 depicts the maturity model that is the framework for the implementation strategy. Appendix 2 provides a correlation matrix of the relationships between SMS system elements, SMS standard subclauses, and implementation phases.

**a. Level One: Planning and Organization.** The first step in development of the SMS is for the organization to analyze its existing programs, systems, and activities with respect to the SMS functional requirements found in Appendix 1 of AC 120-92. For this reason, the analysis is called a “gap analysis,” the “gaps” being those things in the standard that are not already being performed. Once the gap analysis has been performed, an implementation plan is prepared. The company organizes resources and assigns responsibilities and sets schedules and objectives.

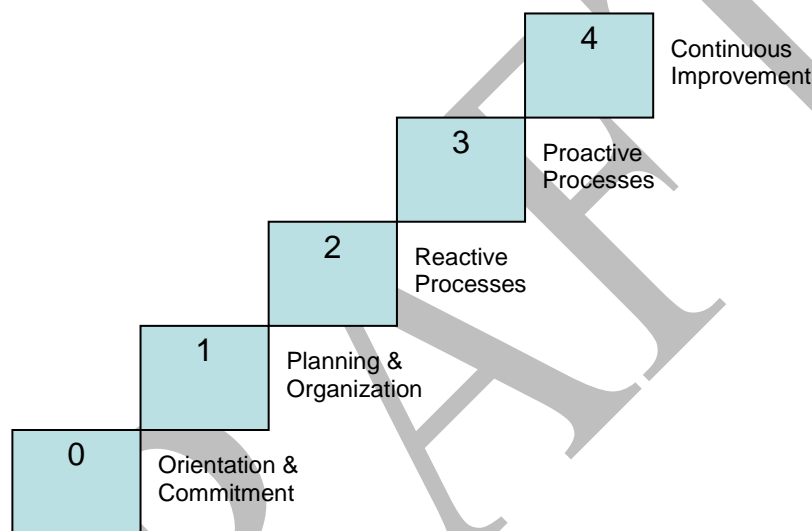
**b. Level Two: Reactive Processes.** At this step, the organization develops and implements a basic risk management process. Basic information acquisition, processing, and analysis functions are implemented and a tracking system for risk control and corrective actions is set up. This allows the organization to react to problems as they occur and to develop appropriate remedial action. For this reason, this level is termed “reactive.” While this is not the final objective of an SMS, it is an important step in the evolution of safety management capabilities.

**c. Level Three: Proactive Processes.** Clause 5 of the SMS standard requires safety risk management (SRM) to be applied to initial design of systems, organizations, and products, development of operational procedures, and planned changes to operational processes. The activities involved in the SRM process involve careful analysis of systems and tasks involved, identification of potential hazards in these functions, and development of risk controls. The risk management process developed at level two is used to analyze, document, and track these activities. Because the organization is now using the process to look ahead, this level is called “proactive.” At this level, however, these proactive processes have been implemented but their performance has not yet been proven.

**d. Level Four: Continuous Improvement.** The final level of SMS maturity is the continuous improvement level. Processes have been in place and their performance and effectiveness has been verified. The complete safety assurance process, including continuous monitoring and the remaining features of the other SRM and safety assurance processes are

functioning. A major objective of a successful SMS is to attain and maintain this continuous improvement status for the life of the organization.

**e. Level Zero.** In addition to the four phases in the ICAO model, the maturity model used will contain a level zero, which will be a preliminary phase of orientation and familiarization for service providers. In this phase, prospective SMS development participants will be given briefings and other information to help them decide whether or not they wish to continue with SMS implementation. It is envisioned that, if rulemaking is accomplished and once SMS regulations are in place, level zero will be deleted. Moreover, once existing certificate holders have implemented required SMSs, the implementation strategy will be integrated into the certification process for affected service provider organizations.



**Figure 1. SMS Maturity Model**

## **8. SMS VOLUNTARY PROGRAM AWARD LEVELS. (Draft Proposal Only 10/3/2007)**

**a.** It is recognized that the full implementation of a SMS at a large and complex organization can take as long as 3 years until all aspects of the program are in place in all departments of the organization. The intent of this program is to allow aviation service providers to implement a SMS in phases, in a standardized manner and to allow recognition of each level of accomplishment.

**b.** Three levels of achievement are specified for this program. Upon successful completion of each level, the service provider will be awarded a certificate of achievement attesting to their accomplishments in the development of their SMS. Organizations may develop their SMSs in a modular fashion across the departments or functions of their organizations. However, attainment of the levels shown below are based on a comprehensive system covering all of the functions listed in clause 4.1 of AC 120-92, Appendix 1. The overall objective is to develop a comprehensive SMS covering the entire organization.

**(1) SMS Bronze: Risk Management Program (Proposed).** This level is awarded when a service provider demonstrates that they have successfully implemented the processes corresponding with level two (reactive processes) of the SMS maturity model.

**(2) SMS Silver: Safety Management System – Provisional (Proposed).** This level is awarded when a service provider demonstrates that they have successfully implemented the processes corresponding with level three (proactive processes) of the SMS maturity model. At this level, all of the processes of the SMS have been designed and implemented in accordance with AC 120-92. Additionally, attainment of this level signifies that the service provider has implemented processes meeting the requirements of ICAO Annex 6, section 3.2 (para. 3.2.4 & 3.2.5). Due to their relative newness, however, the performance and effectiveness of these processes have not been validated. SMS Silver certificates of achievement expire twelve months after their date of issue.

**(3) SMS Gold: Safety Management System (Proposed).** This level is awarded when a service provider demonstrates that they have successfully implemented the processes corresponding with level three of the SMS maturity model and that the performance of these processes has been demonstrated in a performance review conducted by the CHDO, assisted as necessary by members of the Standardization and Assistance Team. Gold status must be renewed every two years by completion of a performance review of the SMS.

**9. ANALYSIS AND ASSESSMENT TOOLS.** Tools have been developed for use in evaluating progress through the implementation process and attainment of award levels. These tools are based on functional objectives developed for each subclause of the standard in AC 120-92, Appendix 1.

**a. Gap Analysis and Design Audit Summary.** The gap analysis and design audit summary tool is contained in Appendix 1 of this AC.

**b. Design Assessment Tools.** A set of design assessment tools (Safety Attribute Inspection tools) has been developed for 14 CFR part 121 air carriers. SMS has been designated as the eighth system of the Air Transportation Oversight System (ATOS), with the four SMS components (“pillars” – policy, safety risk management, safety assurance, and safety promotion) making up four subsystems. Fourteen elements have been created, based on the subclauses of the SMS functional standard.

**10. IMPLEMENTATION PROCESS.** The implementation process is based on meeting the requirements of the standard in Appendix 1 to AC 120-92. A set of tools has been developed to perform gap analyses and assessments of SMS process design. These tools are based on the requirements of the AC 120-92 SMS standard. Each major subclause of the standard has an associated functional objective which conveys the expectation of the subclause’s requirement in a short statement. A summary of these objectives is contained in the gap analysis/design audit tool shown in Appendix 1 to this AC. Additionally, a set of elements compatible with the Air Transportation Oversight System (ATOS) has been developed. The SMS has been designated as the eighth system in the ATOS system structure. The subclauses of the standard have been grouped into four ATOS subsystems and thirteen elements. A summary of the ATOS tools is

contained in Appendix 2 to this AC. These tools' individual items are based on the detailed requirements (below the subclause level) of the SMS standard in AC 120-92. Part 121 operators and other large, more complex organizations should use the detailed tools, with the summary tool serving as an initial gap analysis and later as a summary. Smaller organizations may desire to use the simpler summary tool, leaving the more detailed tools as optional worksheets for specific processes where more detailed analysis is desired.

**a. Level 0. Orientation and Commitment.** Level zero is for certificate holders participating in SMS development, as outlined above. After issuance of the final SMS rule, level zero will apply only to those operators and other service providers who are not required to have an SMS. Level zero ends with a documented commitment on the part of the service provider's management to implement an SMS. The following are typical level zero activities:

- (1) Orientation and outreach presentations
- (2) Distribute SMS documents and participant guide
- (3) Secure commitment to implement SMS (SMS Standard subclauses 4.2 A & B1)

**b. Level 1 – Planning & Organization.** In level 1, basic planning and assignment of responsibilities are conducted. Level 1 begins with a gap analysis. From this gap analysis, participants can determine the current status of the service provider's current safety management processes. From here, detailed planning for development of remaining processes can be done. Level 1 ends with the completion of an SMS implementation plan.

- (1) Identify and assign safety responsibilities to managers.
  - (a) Management commitment and responsibility (4.2B, 4.5A, 4.5B)
  - (b) Safety responsibilities of managers (4.5D, 4.1)
- (2) Identify the person responsible for implementing the SMS.
  - (a) Appointment of key safety personnel (4.5C)
- (3) Describe the system.
  - (a) SMS implementation plan (4.4, 4.1)
- (4) Conduct a gap analysis of existing resources compared to SMS requirements.
  - (a) SMS implementation plan (4.4)
- (5) Develop an SMS implementation plan.
  - (a) SMS implementation plan (4.4)
- (6) Develop documentation relevant to safety policy and objectives.
  - (a) Documentation (4.9)
- (7) Develop and establish means for safety communication.
  - (a) Safety communication (7.2)

- (8) Communicate the SMS implementation to all employees.
  - (a) Safety communication (7.2)
- (9) Develop an initial training plan for all employees.
  - (a) Personnel Competence, Training, and education (7.3 & 7.4)
- (10) SMS implementation plan (4.4)

**c. Level 1 Completion Criteria.** Once the 10 bulleted items above have been completed, there will a joint assessment of the status of SMS development by the Service provider, the Oversight Organization and the Standardization and Assistance Team prior to proceeding to Level 2. The documentation and Audit/Gap Analysis Tools used for Level 1 status assessment are listed below. In conducting the document review and assessment, it should be noted that the objective is to attain a high level implementation plan for the entire organization and, within that plan, detail the processes and procedures for the systems listed in subclause 4.1 of the SMS functional standard in AC 120-92. The following are the documents that should be completed and available at the end of Level 1 and the assessment criteria:

**(1) Documents:**

- (a) Management Commitment Letter
- (b) Management responsibilities defined
- (c) Safety Policy and Objectives
- (d) Safety responsibilities for managers defined
- (e) Results of Gap Analysis of the operator's operational systems
- (f) SMS Implementation Plan for the entire organization
- (g) All Employee Letter or equivalent advising employees of the SMS implementation
- (h) SMS Training Plan for all employees

**(2) Assessment Criteria:** The assessment will be accomplished using the Audit/Gap Analysis Tools below:

- (a) 8.1.1. Organizational Management
- (b) 8.1.2. Document and Records Management
- (c) 8.4.1. Communication and Awareness
- (d) 8.4.2. Personnel Qualification and Training

**(3) Assessment Scale.** All questions on these tools should achieve a score of at least 1, as defined below. All individual questions receiving less than a score of 1 will be reviewed by the Participant, the CMO and the Standardization and Assistance Team for creation of a mutually agreeable solution.

Assessment Scale		
Word Picture	Assessment	Score
No action has been taken on this requirement of the standard.	No Action	0
A plan exists with resources and schedule identified to meet this requirement of the standard. Example: 8.1.1 Section 2, Question 1. Does the operator have a control or controls in place to ensure that all SMS processes are documented, monitored, measured, and analyzed? To achieve a score of 1, the Participant must have policies and procedures defined and written on how the process will be monitored, measured and analyzed, but does not have to have taken any actions to actually do the monitoring, measuring or analysis.	Action Initiated	1

**d. Level 2 – Reactive Processes.** The objective of Level 2 is to correct known deficiencies in safety management practices and operational processes. These may be based on a variety of sources including past inspection and audit reports, accident and incident investigations and employee reports, among others. For this reason, this level is considered reactive. In order to perform these processes in a systematic fashion, basic safety information management and analytical processes must be in place. At the end of Level 2, most of the essential safety management structure and basic functions will be in place. However, because the forward looking systems and task analyses have not yet been conducted, the system is still functioning at a reactive level.

- (1) Develop and implement basic safety information management and analytical processes for reactive safety management processes (6.3-6.7)
  - (a) Information acquisition (6.3)
  - (b) Analysis of data (6.4)
  - (c) System assessment (6.5)
  - (d) Preventive and corrective actions (6.6)
  - (e) Management reviews (6.7)
- (2) Implement safety risk management (SRM) for reactive processes.
  - (a) Hazard identification process (5.2)
  - (b) Risk assessment and mitigation processes (5.3, 5.4, 5.5)
  - (c) Internal safety investigations (6.3.5)
- (3) Perform training relevant to SMS implementation plan and SRM components.
  - (a) Personnel Competence, Training, and education (7.3 & 7.4)
- (4) Develop documentation relevant to SMS implementation plan and SRM components (reactive processes).
  - (a) Documentation (4.9)
- (5) Initiate a non-punitive voluntary employee reporting system. (6.3.6, 4.2B5)

**e. Level 2 Completion Criteria.** Once the 5 bulleted items above have been completed, there will a joint assessment of the status of SMS development by the Service provider, the Oversight Organization and the Standardization and Assistance Team prior to proceeding to Level 3. The documentation and Audit/Gap Analysis Tools used for Level 2 status assessment are listed below. In conducting the document review and assessment, it should be noted that the objective is to develop and implement the specific processes and procedures necessary for applying reactively SMS for the systems listed in subclause 4.1 of the SMS standard in AC 120-92.

**f. Documents:** Processes and Procedures Document for operating the SMS to the level of assessment and actions reactively. This document, or documents, should cover all processes and procedures necessary from information gathering through Safety Risk Management and mitigation.

(1) Voluntary employee reporting program must be documented and initiated.

**g. Assessment Criteria:** Any items from Level 1 that were deferred must have been accomplished and the Audit/Gap Analysis Tools for that item must be completed. The Service provider must have accomplished at least the following:

(1) Conducted SMS training for the staff directly involved in the SMS process to at least the level of accomplishing SMS necessary for the reactive processes.

(2) SMS processes and procedures must have been applied to at least one existing hazard and the mitigation process must have been initiated.

**h.** The following Audit/Gap Analysis Tools are applicable to Level 2:

(1) 8.1.2 Document and Records Management (assess only to a score of 2 on this tool)

(2) 8.1.3 Emergency Response (assess only to a score of 2 on this tool)

(3) 8.2.2 Hazard Identification

(4) 8.2.3 Risk Analysis and Assessment

(5) 8.2.4 Risk Control

(6) 8.3.1 Data Acquisition

(7) 8.3.2 Data Analysis/System Assessment

(8) 8.3.3 Preventive/Corrective Action

(9) 8.4.1 Communication and Awareness

(10) 8.4.2 Personnel Qualification and Training

**i. Assessment Scale.** All questions on these tools should achieve a score of at least 2, as defined below, except as noted on 8.1.2 and 8.1.3 above. All individual questions receiving less than a score of 2 will be reviewed by the Service provider, the Oversight Organization and the Standardization and Assistance Team for creation of a mutually agreeable solution.

Assessment Scale		
Word Picture	Assessment	Score
No action has been taken on this requirement of the standard.	No Action	0
A plan exists with resources and schedule identified to meet this requirement of the standard.	Action Initiated	1
Identifiable actions have satisfied this requirement of the standard. These actions have been observed in policies, procedures, organizational actions, and employee actions.	Implemented	2

**j. Level 3 – Proactive and Predictive Processes.** During Level 3, systems and task analyses are conducted for all of the operational systems listed in clause 4.1 of Appendix 1, AC 120-92 (or equivalent) that are applicable to the organization. The results of these analyses are, in turn, used in a hazard analysis to determine potential problems with the operational processes, their documentation, training, etc. that could pose safety risk. The results of these analyses are then passed through the SRM process, including development of any risk controls and associated process re-design that may be deemed necessary. Information management and analytical processes are refined as necessary. At the end of Level 3, all of the essential components of the SMS have been implemented but their performance has not yet been validated to necessary to ensure sustainment of these processes over time and changes in the operational environment.

- (1) Implement safety risk management for proactive and predictive processes.
  - (a) Hazard identification process (5.2)
  - (b) Risk assessment and mitigation processes (5.3, 5.4, 5.5)
  - (c) Internal safety investigations (6.3.5)
- (2) Perform training relevant to proactive and predictive processes.
  - (a) Personnel Competence, Training, and education (7.3 & 7.4)
- (3) Develop documentation relevant to proactive and predictive processes.
  - (a) SMS implementation plan (4.4)
  - (b) Documentation (4.9)
- (4) Perform a system and task analyses on the systems listed in subclause 4.1 of the standard.
  - (a) The management of change (5B4, 5E)
- (5) Incorporate hazards from system and task analyses into SRM process (5.1 – 5.5)
- (6) Refine safety information management and analytical processes to incorporate proactive safety management processes (6.3 – 6.6)
  - (a) Information acquisition (6.3)
  - (b) Analysis of data (6.4)
  - (c) System assessment (6.5)
  - (d) Preventive and corrective actions (6.6)
  - (e) Management reviews (6.7)

(7) Develop policies and procedures for safety assurance (6.2)

**k. Level 3 Completion Criteria.** Once the 7 bulleted items above have been completed, there will a joint assessment of the status of SMS development by the Service provider, the Oversight Organization and the Standardization and Assistance Team prior to proceeding to Level 4. The documentation and Audit/Gap Analysis Tools used for Level 3 status assessment are listed below. In conducting the document review and assessment, it should be noted that the objective is to develop and implement the full capabilities necessary for applying SMS.

**l. Documents:**

- (1) All Processes and Procedures Documented for operating the SMS. This document, or documents, should cover all processes and procedures necessary from information gathering through Safety Risk Management and mitigation.
- (2) Safety Assurance Policy and Procedures must be documented.

**m. Assessment Criteria:** Any items from Level 2 that were deferred must have been accomplished and the Audit/Gap Analysis Tools for that item must be completed. The Participant must have accomplished at least the following:

- (1) Conducted SMS training for the staff directly involved in the SMS process to level of accomplishing all SMS processes.
- (2) Hazard Analysis must have been conducted on all current operating processes.
- (3) All applicable SMS processes and procedures must have been applied to at least one existing hazard and the mitigation process must have been initiated.

**n.** The following Audit/Gap Analysis Tools are applicable to Level 3:

- (1) 8.1.2 Document and Records Management (assess only to a score of 2 on this tool)
- (2) 8.2.1 System and Task Analysis
- (3) 8.2.2 Hazard Identification
- (4) 8.2.3 Risk Analysis and Assessment
- (5) 8.2.4 Risk Control
- (6) 8.3.1 Data Acquisition
- (7) 8.3.2 Data Analysis/System Assessment
- (8) 8.3.3 Preventive/Corrective Action
- (9) 8.4.1 Communication and Awareness
- (10) 8.4.2 Personnel Qualification and Training

**o. Assessment Scale.** All questions on these tools should achieve a score of at least 2 as defined below, except as noted on 8.1.2 above. No items can be deferred in Level 3.

Assessment Scale		
Word Picture	Assessment	Score
No action has been taken on this requirement of the standard.	No Action	0
A plan exists with resources and schedule identified to meet this requirement of the standard.	Action Initiated	1
Identifiable actions have satisfied this requirement of the standard. These actions have been observed in policies, procedures, organizational actions, and employee actions.	Implemented	2

**q. Level 4 – Operational Safety Assurance and Continuous Improvement**

Level 4 is the final mature level of the SMS. In this level, continuing operational safety is assessed through the implementation of periodic auditing, feedback, and continuous corrective action to maintain both existing risk controls as well as adaptation of operational systems to meet changing needs.

- (1) Implement an the safety assurance practices listed below (6.x)
  - (a) Safety performance monitoring and measurement (6.3.1 - 6.3.3)
  - (b) Continuous improvement of the safety system (6.8, 4.2B2)
- (2) Develop acceptable level(s) of safety (4.7)
- (3) Develop safety indicators and targets (4.7)
- (4) Perform training relevant to operational safety assurance.
  - (a) Personnel Competence, Training, and education (7.3 & 7.4)
- (5) Develop documentation relevant to operational safety assurance.
  - (a) Documentation (4.9)

**r. Level 4 Completion Criteria.** Once the 5 bulleted items above have been completed, there will a joint assessment of the status of SMS development by the Service provider, the Oversight Organization and the Standardization and Assistance Team. The documentation and Audit/Gap Analysis Tools used for Level 4 status assessment are listed below. In conducting the document review and assessment, it should be noted that the objective is to implement Safety Assurance, ensure management’s continued involvement, specialized training is being accomplished and the realization of a mature SMS.

**s. Documents:**

- (1) All SMS program documents that have been previously developed should be reviewed to ensure that any changes, amendments or maturity in the processes or procedures have been appropriately documented.

**t. Assessment Criteria:** The Participant must have accomplished at least the following:

- (1) SMS staff have received all necessary training, including specialty training

- (2) Safety Assurance must have demonstrated by quality management processes such as internal or external audits.
- (3) The Service provider must have applied continuous improvement processes to the SMS program.

u. The following Audit/Gap Analysis Tools are applicable to Level 4:

- (1) 8.1.1 Organizational Management
- (2) 8.1.2 Document and Records Management (assess only to a score of 2 on this tool)
- (3) 8.3.1 Data Acquisition
- (4) 8.3.2 Data Analysis/System Assessment
- (5) 8.4.2 Personnel Qualification and Training

v. **Assessment Scale.** All questions on these tools should achieve a score of at least 2, as defined below, except as noted on 8.1.2 above. Although the score may be the same as in Level 3, the Participant must have conducted implementation actions as noted in Assessment Criteria above. No items can be deferred in Level 4.

Assessment Scale		
Word Picture	Assessment	Score
No action has been taken on this requirement of the standard.	No Action	0
A plan exists with resources and schedule identified to meet this requirement of the standard.	Action Initiated	1
Identifiable actions have satisfied this requirement of the standard. These actions have been observed in policies, procedures, organizational actions, and employee actions.	Implemented	2
This requirement of the standard has been integrated with other SMS functions within the organization.	Integrated	3
This requirement of the standard has been integrated with other SMS functions within the organization. Additionally, this requirement has been subjected to at least one prior round of evaluation/auditing and there is evidence they have been sustained over time. Further, there are no identifiable reasons suggesting that continued sustainment will not occur.	Evaluated and Sustained	4
Conformance with this requirement of the standard is considered state of the art; they could be used as a benchmark for other organizations to use.	State of Art	5

**11. CONTACT.** For additional information of suggestions, please contact the Flight Standards SMS Program Office at (703) 661-0516.

**APPENDIX XX Summary Gap Analysis Tool**

**Summary SMS Audit/Gap Analysis Tool**

SMS Standard AC 120-92 Objective	Detailed Audit/Gap Analysis Tool	Documentation Source	Assessment
<b>4. Policy</b>			
<i>4.1 General Requirements</i>			
Has the organization developed and implemented an integrated and comprehensive SMS for its entire organization?	8.1.1		
<i>4.2 Safety Policy</i>			
Has Top Management defined the organization's Safety Policy and conveyed the expectations and objectives of that policy to its employees?	8.1.1		
<i>4.3 Quality Policy</i>			
Has the organization integrated safety and quality? Is the Quality Policy consistent with the SMS?	8.1.1		
<i>4.4 Safety Planning</i>			
Has organization established, implemented, and maintained a safety management plan that meets safety expectations and objectives?	8.1.1		
<i>4.5 Organizational Structure &amp; Responsibility</i>			
Has the organization defined, documented, and communicated the roles, responsibilities, and authorities regarding safety throughout the organization?	8.1.1		
<i>4.6 Compliance with Legal and other Requirements</i>			
Has the organization's SMS incorporated a procedure to identify and maintain compliance with current safety related, regulatory and other requirements?	8.1.1		

## Summary SMS Audit/Gap Analysis Tool

SMS Standard AC 120-92 Objective	Detailed Audit/Gap Analysis Tool	Documentation Source	Assessment
<i>4.7 Procedures and Controls</i>			
Has the organization assured that auditable procedures exist to provide clear direction and control over all safety-related organizational activities?	All		
<i>4.8. Emergency Preparedness and Response</i>			
Has the organization developed and implemented procedures that it will follow in the event of an accident or incident to mitigate the effects of these events?	8.1.3		
<i>4.9 Documentation and Records</i>			
Has the organization clearly defined and documented safety policies, objectives, procedures, and a documented maintenance process that may be in paper or electronic format?	8.1.2		
<b>5. Safety Risk Management</b>			
Does the organization understand the critical characteristics of its systems and operational environment and apply this knowledge to the identification of hazards, risk decision making, and the design of risk controls?	8.2.1		
<i>5.1 System and Task Analysis</i>			
Has the organization analyzed its systems, operations and operational environment to gain an understanding of critical design and performance factors, processes, and activities to identify hazards?	8.2.1		
<i>5.2 Identify Hazards</i>			

## Summary SMS Audit/Gap Analysis Tool

SMS Standard AC 120-92 Objective	Detailed Audit/Gap Analysis Tool	Documentation Source	Assessment
Has the organization identified and documented hazards that are likely to cause death, serious physical harm or damage to equipment or property in sufficient detail to determine associated risk and acceptability?	8.2.2		
<i>5.3 Analyze Safety Risk</i>			
Has the organization determined and analyzed the severity and likelihood of potential events associated with identified hazards and identified factors associated with unacceptable levels of severity or likelihood?	8.2.3		
<i>5.4 Assess Safety Risk</i>			
Has the organization assessed each identified hazard and defined acceptance procedures and levels of management that can make safety risk acceptance decisions?	8.2.3		
<i>5.5 Control Safety Risk</i>			
Has the organization designed and implemented a risk control for each identified hazard with unacceptable risk to reduce the potential for death, serious physical harm, or damage to equipment or property to acceptable levels? For each risk control, the residual or substitute risk has been analyzed before implementation?	8.2.4		
<i>5.6 Operational Risk Management (New)</i>			
Has the organization applied a risk management process to the conduct and operational control of flight operations including, analysis of the flight and the flight environment, identification of hazards associated with the flight, risk analysis, risk assessment and acceptance processes, and risk control?			

## Summary SMS Audit/Gap Analysis Tool

SMS Standard AC 120-92 Objective	Detailed Audit/Gap Analysis Tool	Documentation Source	Assessment
<i>5.7 Management of Change (New) (ICAO 3.2, AC 120-92 5.0.E)</i>			
Has the organization identified changes within the organization which may affect established processes and services?			
<b>6.0 Safety Assurance and Internal Evaluation</b>			
<i>6.1 General Requirements</i>			
Has the organization monitored, measured, and evaluated the performance and effectiveness of risk controls?	8.3.2		
<i>6.2. System Description</i>			
Has the organization based its safety assurance function on a comprehensive system description as described in the System and Task Analysis section 5.1?	8.2.1		
<i>6.3. Information Acquisition</i>			
Has the organization the organization collected and managed the data necessary to demonstrate the effectiveness of organizational processes and the SMS? (Specific data sources are covered in paragraphs 6.3.1 to 6.3.6)	8.3.1		
<i>6.3.1 Continuous Monitoring</i>			
Has the organization monitored operational data, including products and services received from contractors, to identify hazards, measure the effectiveness of safety risk controls, and assess system performance?	8.3.1		
<i>6.3.2 Internal Audits by Operational Departments</i>			

## Summary SMS Audit/Gap Analysis Tool

SMS Standard AC 120-92 Objective	Detailed Audit/Gap Analysis Tool	Documentation Source	Assessment
Has the organization performed regularly scheduled internal audits of operational processes, including those performed by contractors, to determine the performance and effectiveness of risk controls?	8.3.1		
<i>6.3.3 Internal Evaluation</i>			
Has the organization conducted, at planned intervals, internal evaluations of the SMS and operational processes, to determine that the SMS conforms to its requirements?	8.3.1		
<i>6.3.4 External Auditing of the SMS</i>			
Has the organization included the results of audits performed by oversight organizations in its Analysis of Data (6.4)?	8.3.1		
<i>6.3.5 Investigation</i>			
Has the organization established procedures to collect data and investigate incidents, accidents and instances of potential regulatory non-compliance that occur to identify potential new hazards or failures of risk controls?	8.3.1		
<i>6.3.6 Employee Reporting and Feedback System.</i>			
Has the organization established and maintained a confidential employee safety reporting and feedback system? Are the data obtained from this system monitored to identify emerging hazards and to assess performance of risk controls in the operational systems?	8.3.1		
<i>6.4. Analysis of Data</i>			

## Summary SMS Audit/Gap Analysis Tool

SMS Standard AC 120-92 Objective	Detailed Audit/Gap Analysis Tool	Documentation Source	Assessment
Has the organization analyzed the data described in section 6.3 to assess the performance and effectiveness of risk controls in the organization's operational processes and the SMS and to identify root causes of deficiencies and potential new hazards?	8.3.2		
<i>6.5 System Assessment</i>			
Has the organization performed an assessment of the performance and effectiveness of risk controls, and conformance with SMS requirements?	8.3.2		
<i>6.6. Preventive/Corrective Action</i>			
Has the organization taken action to eliminate nonconformances identified during analysis to prevent recurrence?	8.3.3		
<i>6.7. Management Reviews</i>			
Has Top Management conducted regular reviews of the SMS, including outputs of Safety Risk Management (Section 5); Safety Assurance (Section 6); and Lessons Learned (Section 7.5)? Has management reviews included assessing the performance and effectiveness of an organization's operational processes and the need for changes?	8.3.2		
<i>6.8 Continual Improvement</i>			
Has the organization continually improved the effectiveness of the SMS and of safety risk controls through the use of the safety and quality policies, objectives, audit and evaluation results, analysis of data, corrective and preventive actions?	8.1.1		
<b>7.0 Safety Promotion</b>			
<i>7.1 Safety Culture</i>			

## Summary SMS Audit/Gap Analysis Tool

SMS Standard AC 120-92 Objective	Detailed Audit/Gap Analysis Tool	Documentation Source	Assessment
Has Top Management promoted their commitment to safety and the SMS including clear and regular communication of safety policy, goals, objectives, and standards? Has the organization provided a confidential and effective employee safety feedback system, as well as, provide the resources essential to implement and maintain the SMS?	All		
<i>7.2 Communication and Awareness</i>			
Has Top Management communicated the output of the organization's SMS to its employees, and provide access to SMS outputs to its oversight organization in accordance with established agreements and disclosure programs?	8.4.1		
<i>7.3 Personnel Requirements (Competence)</i>			
Has the organization documented competency requirements for those positions identified in Section 4.5.D and ensure those requirements are met?	8.4.2		
<i>7.4 Training</i>			
Has the organization developed and documented initial and recurrent training programs that are regularly evaluated?	8.4.2		
<i>7.5 Safety Lessons Learned</i>			
Has the organization promoted continuous improvement of its SMS by using safety lessons learned and communicating them to all personnel?	8.3.2 and 8.4.1		

<b>Assessment Scale</b>		
<b>Word Picture</b>	<b>Assessment</b>	<b>Score</b>
No action has been taken on this requirement of the standard.	No Action	<b>0</b>
A plan exists with resources and schedule identified to meet this requirement of the standard.	Action Initiated	<b>1</b>
Identifiable actions have satisfied this requirement of the standard. These actions have been observed in policies, procedures, organizational actions, and employee actions.	Implemented	<b>2</b>
This requirement of the standard has been integrated with other SMS functions within the organization.	Integrated	<b>3</b>
This requirement of the standard has been integrated with other SMS functions within the organization. Additionally, this requirement has been subjected to at least one prior round of evaluation/auditing and there is evidence they have been sustained over time. Further, there are no identifiable reasons suggesting that continued sustainment will not occur.	Evaluated and Sustained	<b>4</b>
Conformance with this requirement of the standard is considered state of the art; they could be used as a benchmark for other organizations to use.	State of Art	<b>5</b>

**APPENDIX 2. SMS Element Detail**

Standard	Audit Tool*	Implementation Level			
		1	2	3	4
<b>Safety Management System</b>	<b>8.0 Safety Management System</b>				
<b>4. Policy</b>	<b>8.1 SMS Management</b>				
4.1. General Requirements	8.1.1 Organizational Management	√			√
4.2. Safety Policy	8.1.1 Organizational Management	√			√
4.3. Quality Policy	8.1.1 Organizational Management	√			√
4.4. Safety Planning	8.1.1 Organizational Management	√			√
4.5. Organizational Structure and Responsibilities	8.1.1 Organizational Management	√			√
4.6. Compliance with Legal and Other Requirements	8.1.1 Organizational Management	√			√
4.7. Procedures and Controls	All	√	√	√	√
4.8. Emergency preparedness and Response	8.1.3 Emergency Response		√		
4.9. Documentation and Records Management	8.1.2 Document and Records Management	√	√	√	√
<b>5. Safety Risk Management</b>	<b>8.2 Safety Risk Management</b>				
5.1. System and Task Analysis	8.2.1 System and Task Analysis			√	
5.2. Identify Hazards	8.2.2 Hazard Identification		√	√	
5.3. Analyze Safety Risk	8.2.3 Risk Analysis and Assessment		√	√	
5.4. Assess Safety Risk	8.2.3 Risk Analysis and Assessment		√	√	
5.5. Control Safety Risk	8.2.4 Risk Control		√	√	
5.6. Operational Risk Management (Proposed)	8.2.5 Operational Risk Management (Proposed)				
<b>6. Safety Assurance and Internal Evaluation</b>	<b>8.3 Safety Assurance</b>				
6.1. General Requirements	8.3.2 Data Analysis/System Assessment		√	√	
6.2. System Description	8.2.1 System and Task Analysis			√	
6.3. Information Acquisition	8.3.1 Data Acquisition		√	√	√
6.4. Analysis of Data	8.3.2 Data Analysis/System Assessment		√	√	
6.5. System Assessment	8.3.2 Data Analysis/System Assessment		√	√	
6.6. Preventive/Corrective Action	8.3.3 Preventive/Corrective Action		√	√	

Standard	Audit Tool*	Implementation Level			
		1	2	3	4
6.7. Management Reviews	8.3.2 Data Analysis/System Assessment		√	√	
6.8. Continual Improvement	8.1.1 Organizational Management				√
<b>7. Safety Promotion</b>	<b>8.4 Safety Promotion</b>				
7.1. Safety Culture	All	√	√	√	√
7.2. Communication and Awareness	8.4.1 Communication and Awareness	√			
7.3. Personnel Requirements (Competence)	8.4.2 Personnel Qualification and Training	√	√	√	√
7.4. Training	8.4.2 Personnel Qualification and Training	√	√	√	√
7.5. Safety Lessons Learned	8.3.2 Data Analysis/System Assessment 8.4.1 Communication and Awareness		√	√	√

\* Include safety assurance question from SMS AC 6.2 into 8.2.1  
 Include SMS AC 5.B.4 into 8.2.1  
 Include SMS AC 5.E into 8.2.3

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### APPENDIX 3. Correlation between FAA SMS Standard and ICAO SMS Framework

ICAO Framework	FAA (AC 120-92)
<b>1. Safety policy and objectives</b>	<b>4. Policy</b>
1.1 – Management commitment and responsibility	4.1. General Requirements
	4.2. Safety Policy
	4.3. Quality Policy
	4.5. Organizational Structure and Responsibilities
1.2 – Safety accountabilities of managers	4.5. Organizational Structure and Responsibilities
1.3 – Appointment of key safety personnel	4.5. Organizational Structure and Responsibilities
1.4 – SMS implementation plan	4.4. Safety Planning
	4.6. Compliance with Legal and Other Requirements
	4.7. Procedures and Controls
1.5 – Coordination of the emergency response plan	4.8. Emergency preparedness and Response
1.6 – Documentation	4.9. Documentation and Records Management
<b>2. Safety risk management</b>	<b>5. Safety Risk Management</b>
2.1 – Hazard identification processes	5.1. System and Task Analysis
	5.2. Identify Hazards
2.2 – Risk assessment and mitigation processes	5.3. Analyze Safety Risk
	5.4. Assess Safety Risk
	5.5. Control Safety Risk
2.3 – Internal safety investigations	6.5. System Assessment
Nothing Comparable	5.6. Operational Risk Management (Proposed)
<b>3. Safety assurance</b>	<b>6. Safety Assurance and Internal Evaluation</b>
3.1 – Safety performance monitoring and measurement	6.1. General Requirements
	6.2. System Description
	6.3. Information Acquisition
	6.4. Analysis of Data
	6.5. System Assessment
	6.6. Preventive/Corrective Action

ICAO Framework	FAA (AC 120-92)
	6.7. Management Reviews
3.2 – The management of change	5.7. Change Management (New)
3.3 – Continuous improvement of the safety system	6.8. Continual Improvement
<b>4. Safety promotion</b>	<b>7. Safety Promotion</b>
4.1 – Training and education	7.1. Safety Culture
	7.3. Personnel Requirements (Competence)
	7.4. Training
	7.5. Safety Lessons Learned
4.2 – Safety communication	7.2. Communication and Awareness

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